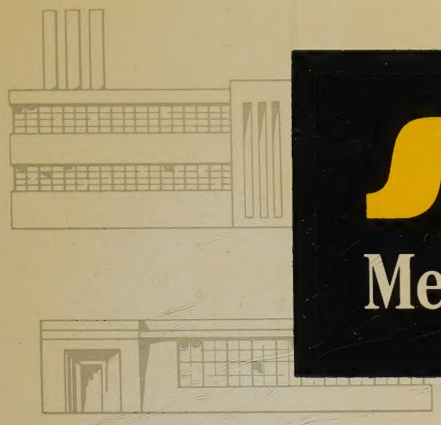
MAY 2, 1955

STEEL
The Metalworking Weekly



WHAT'S HAPPENING TO JOB SHOPS?

They're caught in a profit squeeze. Here's what ten successful manufacturers do to ease the pressure
—page 73

✔ Trends in Metal Turning
page 106

✔ New Designations for Stainless
page 159

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B&W TUBING UNIFORMITY – MULTIPLIED 1194 TIMES

If you had this many tubes to roll in, there would be no delay if you used B&W tubes.

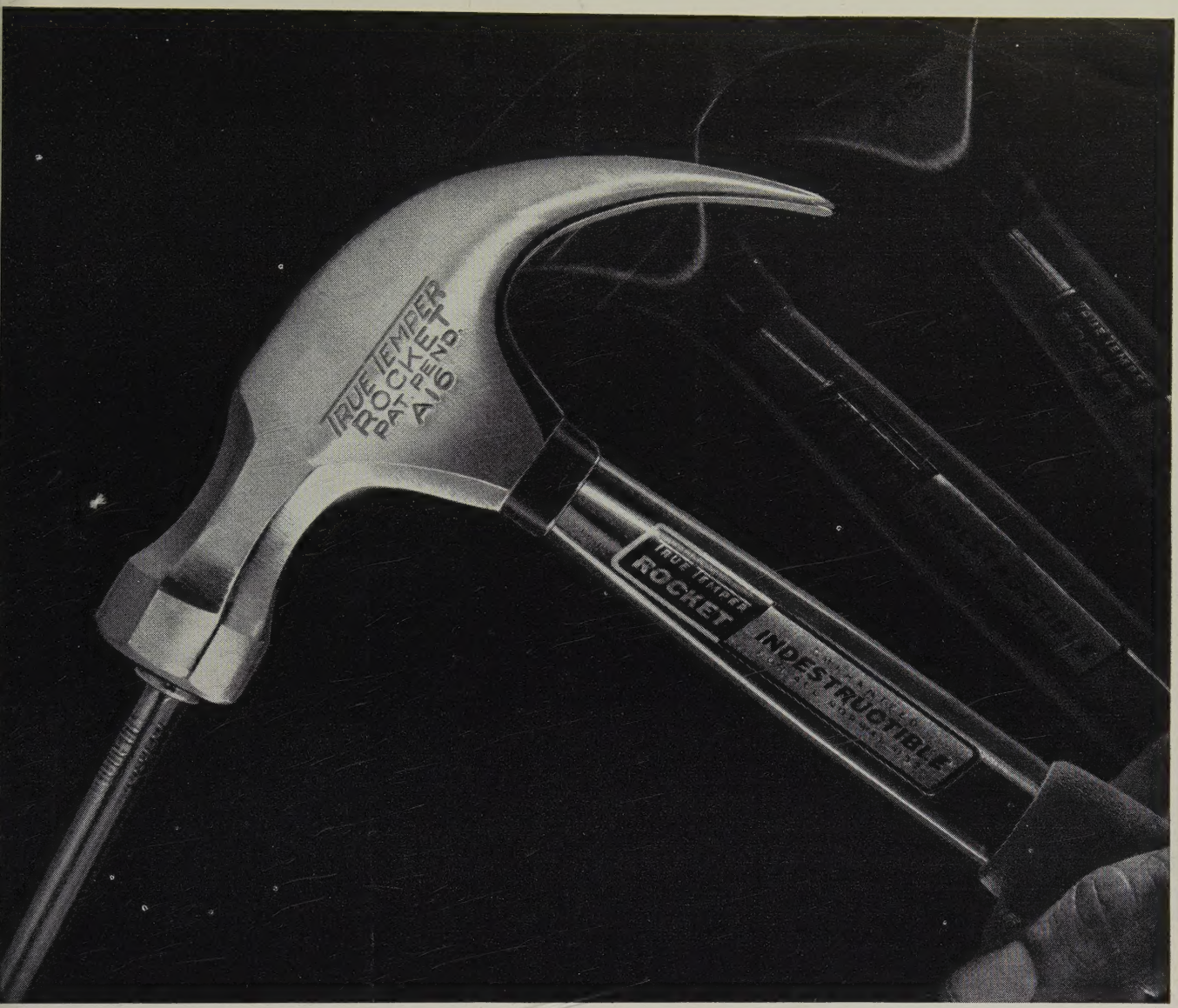
For heat exchangers, for condensers, in fact for every pressure tubing application, you can rely on B&W tubing for uniform wall thickness, uniform ductility, tight joints, and low installation cost.

Always specify B&W pressure tubing. It meets all dimensional and mechanical requirements, and is available, in all commercial sizes, in a wide range of carbon, alloy and stainless grades. *Write for Technical Bulletin 329 S.*

B&W
TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

TA-5019(P)



We helped make this hammer a smashing success

One of today's hottest hardware items is the True Temper Rocket, a new type of hammer that is guaranteed by the manufacturer to be indestructible in normal use.

In forging that hard-hitting head the True Temper people are using very substantial quantities of hot-rolled high-carbon bars of C-1078 steel supplied by Bethlehem. They put the forged head through a series of heat-treating operations that tempers the three critical zones—the striking face, the claws and the head—giving each one the exact combination of strength, hardness and toughness that it needs. Finally the entire head is polished to a lustrous finish.

These operations call for good, sound bar stock, the kind that so many prominent manufacturers, like True Temper Corporation, know they can count on from Bethlehem.

If your product requires hot-rolled carbon-steel bars, why not call on Bethlehem? Our carbon-steel bar products include standard sections, special sections and bar-size shapes. Also semi-finished carbon-steel products, including blooms, billets and slabs.

We suggest that you place your order with the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

RELY ON PHILLIPS FOR DEPENDABLE SUPPLY!

The storage facilities, pictured above, are part of Phillips Petroleum Company's many installations which help assure you of a dependable, year-around supply of Philgas. Pipelines carry Philgas to strategically situated underground storage facilities, with capacity of hundreds of thousands of barrels. In this manner Philgas, produced in summer, is available to meet peak demands of the winter months.

Many of this nation's leading industries are installing their own Philgas systems for core baking, mold drying, heat treating of all kinds, ceramic operations, food processing, textile finishing, metal cutting, space heating and scores of other uses. Philgas is also used as a motor fuel by many of these same industries.

Phillips experienced field-trained LP-Gas engineers will be glad to consult with you and show you how you can cut operating expenses by changing to this clean-burning, all-purpose fuel.

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IS AMERICA'S LARGEST SELLING BRAND OF LP-GAS!

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Hobart 900-ampere "Powromatic" Constant Voltage We connected to a tractor driven welding head for welding plate in the construction of river barges. Hobart's simpli lightweight control kit is shown mounted on the tractor.

Photo courtesy of Maxon Construction Co., Marine Division, Tell City, Ind

Maxon simplified production and increased weld rate with this—

HOBART CV POWROMATIC

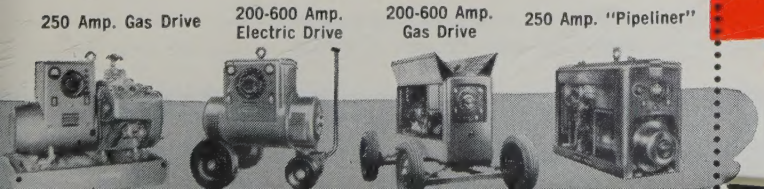
a *NEW* "Simplified" WELDER and CONTROLS for Automatic Welding

"Powromatic" is Hobart's constant voltage power source and simplified controls for all automatic and semi-automatic welding processes.

MARINE DIVISION of Maxon Construction Co., Tell City, Indiana, recently began using a "Powromatic" welder to weld 5/16 and 3/8-inch barge deck plate. The length of the weld is approximately 85 feet with torch cut edges and no back-up on the butt joint. Conventional equipment was replaced by "Powromatic" because of easier arc control and the reduction of weight on the tractor type head, making it more maneuverable and easier to manipulate. Through the use of Hobart CV, the weld rate was increased from 30 to 40 inches per minute and the operation was greatly simplified.

OTHER ADVANTAGES found in the Hobart "Powromatic" welder and controls are: The operator is assured of a constant arc voltage because the brushes on the main generator end of the unit can be adjusted so that the voltage drop in extended welding cable is compensated for by a slightly rising voltage characteristic. And the arc voltage of Hobart's "Powromatic" remains constant even when there are fluctuations in the input voltage. It completely eliminates burn-back and burn-through due to arc voltage fluctuations.

THE SIMPLICITY and superior control of Hobart "Powromatic" welders are reducing manufacturing costs wherever they are installed. If you use automatic welding now, or intend to in the future, you should investigate "Powromatic." Check coupon and return for complete details.



HOBART BROTHERS COMPANY
BOX ST-55, TROY, OHIO, U.S.A. Phone 21223

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Without obligation, please send me complete information on items checked below.

- ☐ Complete information on Hobart CV POWROMATIC and Heads for Automatic Welding.
- ☐ Tell me how we can simplify Automatic Welding with our present Heads by using Hobart POWROMATIC.
- ☐ Send latest HOBART Simplified Arc Welder Catalog.

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FIRM_____

ADDRESS

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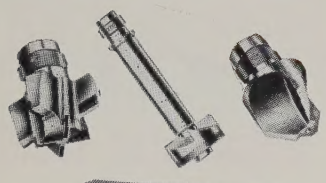
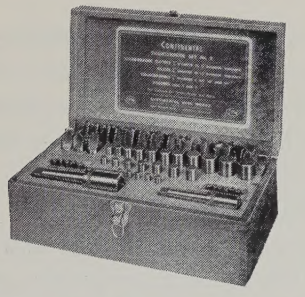
Twist of the Wrist

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE





Continental Counterbores may be purchased individually or in sets. Selection of three sets available. Write for new Counterbore Catalog.

THESE FEATURES WILL SAVE YOU TIME AND SAVE YOUR TOOLS:

Hand Detachable—one quarter turn by hand, ***a twist of the wrist*** engages or releases cutter.

Balanced Drive—*double* lugs on cutter engage *double* abutments in holder; *double* aligning bearings for rigidity.

Extra Torsional Rigidity—drive lugs are close to seating shoulder of cutter.

Practically Indestructible—driving forces apply compression, not shearing action.

Right or Left Hand—one quarter turn locks or releases either right- or left-hand cutters.

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The Continental Drive is available in standard counterbores, spot facers, countersinks, and also on special tools such as multiple-diameter cutters, step counterbores, radius and chamfering applications. It is equally applicable for inverted operations. Order through your Ex-Cell-O representative or direct from Continental Tool Works in Detroit.

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CTW
EX-CELL-O CORPORATION

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Division of Ex-Cell-O Corporation · Detroit 32, Michigan

STEEL
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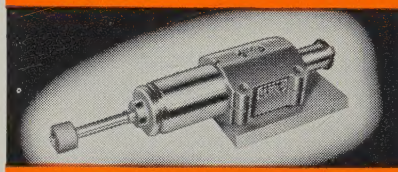
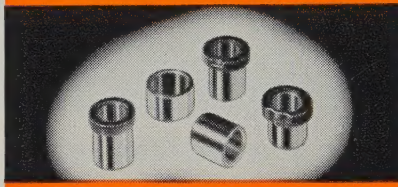
XLO
EX-CELL-O for PRECISION

PRECISION MACHINE TOOLS

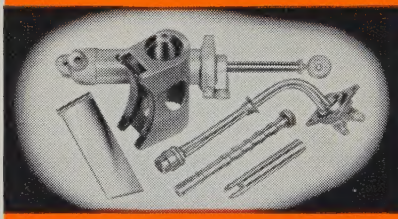
CONTINENTAL CUTTING TOOLS



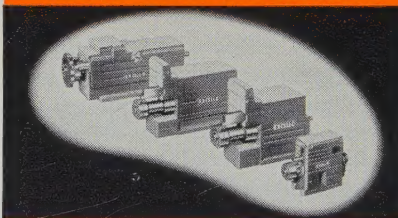
PRECISION GRINDING SPINDLES



DRILL JIG BUSHINGS



AIRCRAFT AND PRECISION PARTS



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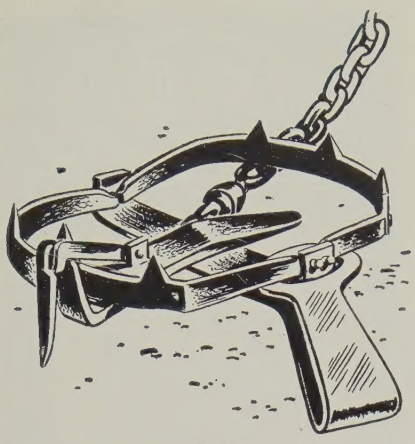

TOUGH on the hands

Every time a worker's hands are snared by jagged metal, production suffers, and insurance men take a second look at rates. Skilled hands should never be bare hands. Protect them with Jomac® Work Gloves. Jomacs, made of rugged, springy, twisted-loop fabric, cut accident rates in plants throughout the country. Jomacs are low in cost because they wear so long. Write today for our new catalog.

Send for a free sample of Jomacs. Describe your operations, temperature conditions, etc. We'll gladly recommend an economical Jomac Work Glove and send you a sample pair. Jomac Inc., Dept. E, Philadelphia 38, Pa.

It pays to keep Jomacs on hand

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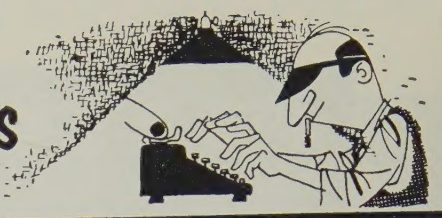
behind the scenes



Job Shops at Crossroads

We take our text this morning from the epistles of Assistant Managing Editor John Morgan to the operators of job shops. John urges the faithful to abjure (two-bit expression for "drop like a hot potato") complacency with current facilities, sales methods and production. He enlarges on the peculiar problems that silver the hair and pucker the brow of job shop management, and bases his findings on a survey recently conducted by STEEL.

Everybody who operates, or buys from, or sells to, or owns a piece of a job shop should find Editor Morgan's examination and summary of this situation of singular interest. Unless job shops follow their own suggestions, as reported by Morgan on page 73, they may wither on their foundations.

Machining Developments

As one of the many continuing services to its readers, STEEL this week presents the first article in a machining series. Titled "Metal Turning," it considers, naturally, metal turning. Machine Tool Editor Bob Huber is the daddy of this series, and he permits himself to be deeply impressed by the almost fantastic improvements that have been built into today's machine tools. You sense this enthusiasm as you read his comparison of modern machining equipment with that made only ten years ago.

Metal turning is a mighty ancient human endeavor; it probably first occurred to the shaggy old boys who had served their time at the potter's wheel, and it is quite likely that they gave up, too, because metal-cutting tools were at a premium long before they were invented, as they say in Ireland. So keep an eye on the Machining Series: You will find it interesting and profitable.

Perils of Newsgathering

Washington, D. C., in 1900 had a population of 200,000 whites and 90,000 Negro citizens just 35 years or so removed from slavery. The Civil War was as near to them as World War I is to us . . . and the town really hadn't changed since the day Lincoln proclaimed the tune "Dixie" a legitimate trophy of war.

Today, more than a million persons bulge Washington and environs, and nobody is more aware of that than Associate Editor Robert Jaynes. Bob was sent by STEEL to pursue information along the Potomac, so when he appeared before the clerk at a Washington hotel, clutching a reservation in his hot little fist, he anticipated no difficulties. Unfortunately, for our man, a convention hiving in the hostelry decided to stay over another day, and Robert found himself out in the street.

At about 2 a.m. the hotel found him a bed in an inn customarily rejected even by river pirates, and we have a suspicion that he went to sleep fully dressed. On the following morning, in reply to a frantic telephone call, a taxi driver came to deliver him. They drove several miles in silence, then the driver turned to Jaynes.

"Almost didn't come out here to pick you up, Mac. Never know what kind of a creep you're liable to find in that flophouse."

Hasraphij's Horses

At the date of this writing, we have received only one correct answer to the puzzle about Uncle Horace's watch with the misplaced hands. Don Horwitz, who, appropriately enough, is in charge of timekeepers at King Koil Sleep Products, St. Paul, sent in two answers; his second one was right: Five and five-eleventh minutes past three.

Back in the hills of old Glengassie lived a gypsy horsetrader named Hasraphij who was always kind to his mother. He rated two red stallions as worth three brown mares and a black colt, and was willing to trade 25 old gray mares for a package of three red stallions, two black colts and a brown mare. How many old gray mares would Hasraphij have traded for one red stallion, or one brown mare, or one black colt?

Shrdlu

(Metalworking Outlook—Page 57)

End Coke Quenching Corrosion with INSUL-MASTIC Coatings

Top-view of a U. S. Steel Corp. coke battery at Clairton, Pa., coated with INSUL-MASTIC.

Where do you need a protective coating? Our technical engineers can tell you. Write for information about this consultant service before planning to build or coat.

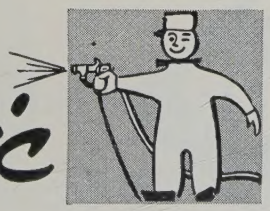
Here is the top-side of a coke battery. A carload of burning coke has just been quenched. Steam is drifting over all metal equipment in the area. Once this would have meant severe corrosion, but now INSUL-MASTIC protects this equipment.

INSUL-MASTIC coatings are ending coke quenching corrosion in steel mills and chemical plants everywhere. They are extremely durable and not affected by corrosive industrial atmospheres. INSUL-MASTIC coatings now in coke battery service six years prove that many, many more years of life can still be expected. INSUL-MASTIC is a *Superior* bituminous coating having carefully selected mineral fillers. It is spray applied $\frac{1}{16}$" to $\frac{1}{8}$" thick.

Throughout the nation, mills and plants having coke battery operations are specifying INSUL-MASTIC. They are coating all pipes, tanks, beams and other equipment normally corroded by industrial atmospheres.

Write today for the name of your nearest INSUL-MASTIC representative.

Insul-Mastic



think first of the coatings that last!

Representatives in Principal Cities

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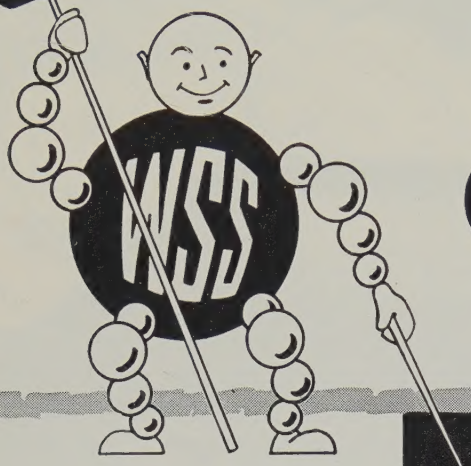
PREMIUM PERFORMANCE BRINGS COSTS DOWN!



WHEELABRATOR® STEEL SHOT

COSTS 62% LESS

at HOOSIER IRON WORKS

MAINTENANCE COSTS ARE SLASHED, TOO

Abrasive costs per ton of castings cleaned were slashed from 75c to only 28c when Hoosier Iron Works, Kokomo, Ind., switched to Wheelabrator Steel Shot.

An additional saving was effected in the 15% to 33% longer life of wearable machine parts.

Manufactured under rigid control every step of the way, this premium electric furnace steel shot is made tough, hard and uniformly round. These properties make Wheelabrator Steel Shot last much longer, reducing abrasive costs. These same properties cut maintenance costs because they eliminate excessive machine-parts wear from sharp edges of broken shot.

Write for Bulletin 89B.

PERFORMANCE AT HOOSIER IRON WORKS

ABRASIVE	Chilled Iron Shot and Grit	Wheelabrator Steel Shot
Tons of Castings Cleaned	1018	1078
Pounds of Abrasive Consumed	13,400	2450
Cost of Abrasive Per Wheel Hour	$2.84	$1.07
Pounds of Abrasive Consumed Per Ton of Castings	13.2	2.3
Abrasive Cost Per Ton of Castings	75c	28c

note

Price alone does not determine cost. Although the original price of Wheelabrator Steel Shot is more than that of chilled iron its actual cost for Hoosier Iron Works is less than half. Premium performance brings costs down.

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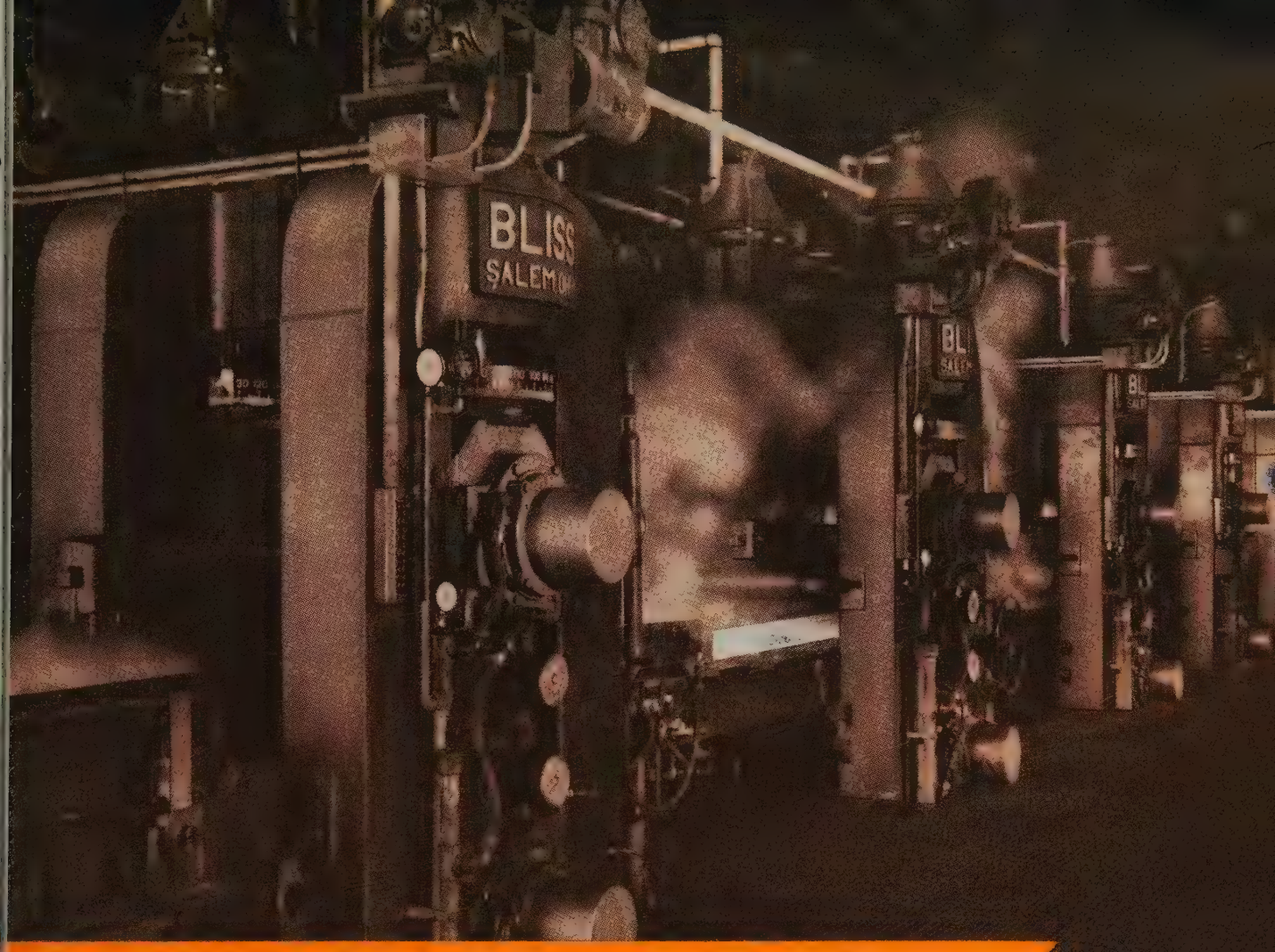

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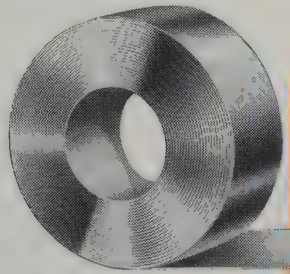

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1212 Rand Building

LOS ANGELES 36, CA
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NEW YORK 17, N.Y
6408 Chrysler Building

PITTSBURGH, PA.
Hammond and Gregg S
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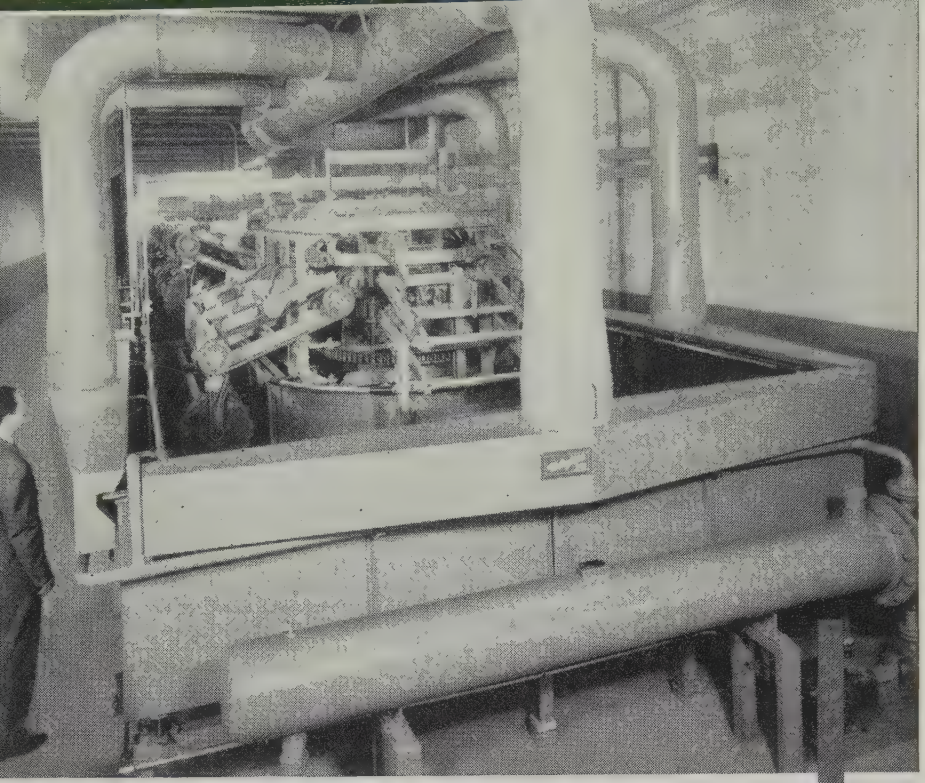

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Udylite Automatic Barrel Proves Its Flexibility and High Capacity in Actual Production

The new Udylite full automatic horizontal barrel plating machine is a heavy duty, high production, return type unit, designed and built for any standard plating process.

Now in production plating, this new machine incorporates Udylite's years of experience as a foremost horizontal barrel producer plus Udylite's fully automatic engineering genius.

Special features include delayed set downs and skip transfers with complete operational control by the operator. Each cylinder can be raised or lowered independently of the rest. Electrical controls pre-determine desired number of cylinders per hour and time of cylinders in each bath. Speeds can be reduced in the post plate cycle. These and other features mean unheard of operational flexibility.

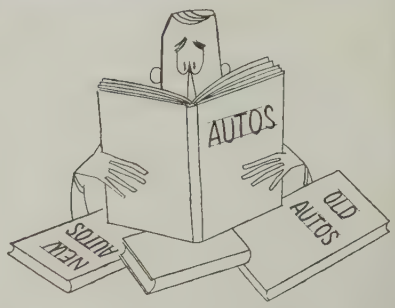
Get more facts about this new Udylite automatic barrel plating machine. Write for literature today or contact your local Udylite representative.

WORLD'S LARGEST PLATING SUPPLIER

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

LETTERS TO THE EDITORS

Front-Wheel Drive



Do you know the company which built a car with a front drive some years ago? Any information—such as the number of the patent—would be appreciated.

Your articles in the "Mirrors of Motordom" department interest not only those connected with the manufacture of cars or parts, but practically everyone who owns and drives. I don't know anyone better posted on the automobile.

W. Calver Moore
446 S. 49th St.
Philadelphia

• *Kaiser built a front-wheel drive car in 1946, but dropped it in 1947. In the 1930's, the old Auburn Motor Co. used the front drive on the Cord. We have no detailed information on them, but you can probably get more data on the Kaiser by writing Kaiser Motor Corp., Toledo, O.—ED.*

Aircraft Steel

We are a small cold-heading plant with the majority of our production tied up with aircraft materials. Our biggest problem is to procure aircraft-quality alloy steels. We would appreciate your digging into your files for sources of these steels.

R. G. Cardin
Purchasing Department
Products Engineering Corp.
Tulsa, Okla.

• *We have no listing of those who make aircraft-quality alloy steel for cold-heading purposes. We are forwarding you a list of producers of cold-finished alloy bars, since those who make alloy steel can make it to aircraft quality on order.—ED.*

Latest Edition?

Is your *Specifications Handbook* dated January, 1953, the latest edition? Also, what is the cost per copy? Thank you.

Frederick O. Ward
assistant to the president
Stacey Mfg. Co.
Cincinnati

• *A revised edition,* Cross Index of Chemically Equivalent Specifications and Identification Code for Ferrous and Nonferrous Alloys (Supply and Logistics Handbook H 1A), *has been published by the United States Printing Office. It is available at $1.75 per copy either through* STEEL's *Readers Service, Penton Bldg., Cleveland 13, O. or the Superintendent of Documents, Washington 25, D. C.—ED.*

(Please turn to page 12)

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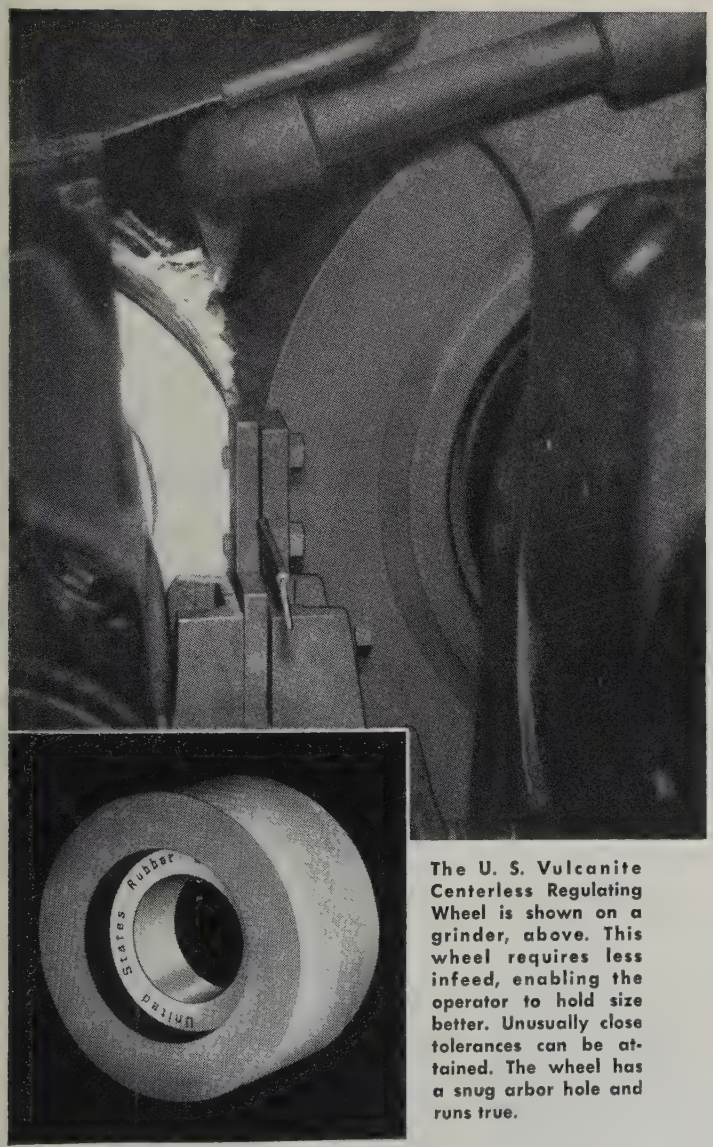
2 withstands the punishment of whipping in bar grinding

The U. S. VULCANITE Centerless



The U. S. Vulcanite Centerless Regulating Wheel is shown on a grinder, above. This wheel requires less infeed, enabling the operator to hold size better. Unusually close tolerances can be attained. The wheel has a snug arbor hole and runs true.

Here is a wheel that has 2 solid years of development behind it—all done by United States Rubber Company technicians. *The needs of customers were carefully studied.* Industry required a durable and economical wheel that would meet the 2 conditions named above. And U. S. VULCANITE is that wheel.

The new Vulcanite Regulating Wheel is unusually uniform—both across the face of the wheel, radially through the wheel, and from wheel to wheel.

This new regulating wheel is made of a compound which has extreme resistance to wear, and just the right degree of traction and cushion. It requires less infeed, enabling the operator to hold size better. Tolerances can be held to as close as one and 2 tenths of a thousandth on the finished piece.

YET THE U. S. REGULATING WHEEL COSTS NO MORE THAN ORDINARY WHEELS!

EXTRA DIVIDEND: When you buy wheels from United States Rubber Company you are buying *direct* and are being served by a specialist—a man whose only job is selling and servicing abrasive wheels. It's his job to see that you get top value for your abrasive wheel dollars.

"U.S." Research perfects it . . .
"U.S." Production builds it . . .
U.S. Industry depends on it.

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MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

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Extra Heavy Duty
Extra Safety
Extra Durability
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Extra Accessibility

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Extra Economy
Extra Safety
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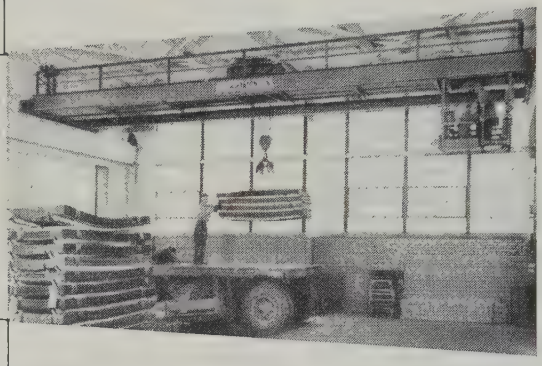
Extra Accessibility



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Extra Accessibility
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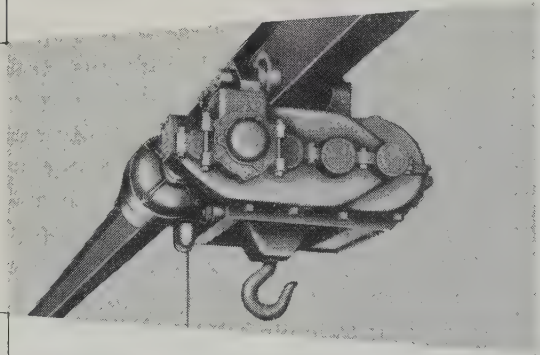

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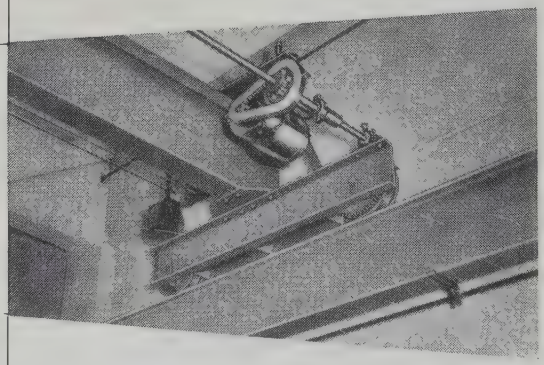

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NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

LETTERS

(Concluded from page 10)

Metal in Houses

We enjoyed reading your article, "Metals' Growing Stake in Housing" (Apr. 11, page 65). May we have your permission to reprint it in the *Executive Review?* The publication is a new house organ distributed by a few Chicago firms to approximately 2500 businessmen.

Harold Sabes
Executive Review
Chicago

• *Permission granted.—ED.*

Good Readership

Recently I received copies of two articles from your Program for Management series. They are worn from being passed among members of my department. May I have a complete series for my personal use? I also would appreciate two Steel Hardness Conversion Charts (Jan. 10, page 70).

J. Hunter
foreman, steel control
Chicago Rawhide Mfg. Co.
Detroit

• *Sent.—ED.*

Statistical Know-How

Will you please send to my attention two copies of the article, "Steel Buying by Statistics" (Apr. 18, page 104)?

D. E. Seelbach
head of quality control
Denison Engineering Co.
Columbus, O.

Please furnish us with three copies.

E. A. Jackson
metallurgical engineer
Studebaker-Packard Corp.
Detroit

• *Sent.—ED.*

Putting Fuel in the Fire

The four-part article on burdening the blast furnace in the Feb. 7, 14, 21, and 28 issues and the article, "Oxygen Steelmaking Arrives" (Apr. 4, page 80), are of considerable interest to us. May we reprint them for distribution to our organization and its affiliated companies in the United States and foreign countries?

W. Standerwick
Advertising and Sales Promotion
National Carbon Co.
Division, Union Carbide & Carbon Corp.
New York

• *Permission granted. Tearsheets are still available in limited quantities.—ED.*

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And all these newsworthy developments are brought to you immediately by your Morse-Franchised Distributor . . . to boost your production and cut your tool costs with more (and more accurate) holes per dollar. What's more, he has the practical know-how to apply the right Morse Tools to your cutting operations, and get you the top return for your investment.

So get in touch with your Morse-Franchised Distributor right away. He's the man everybody is looking for today . . . *the cost-cuttingest man in town!*

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NEW BEDFORD, MASSACHUSETTS
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Frame-up
TO GIVE YOU
MORE
FOR YOUR MONEY

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Green Tenite handle, one-piece, heat treated, solid steel back with long-wearing, rust-proof, crackle finish, and 12-inch Star Unbreakable Special Flexible Blade,
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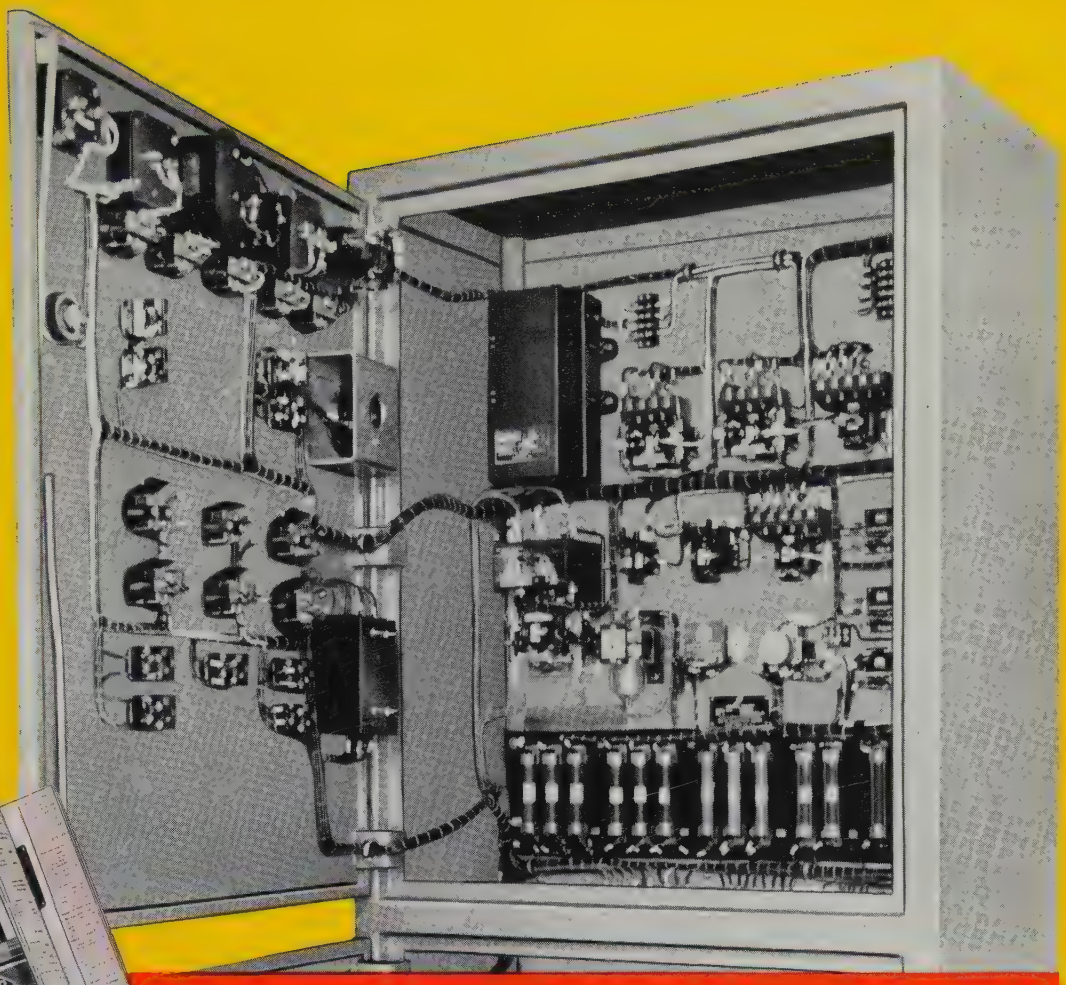
The Sign of
QUALITY
MOTOR CONTROL

Control panel for BETA dust precipitator rectifier, shown below with door closed. It has 3 Bulletin 709 starters, 2 Bulletin 700 relays, Bulletin 702 contactor, and Bulletin 809 overload relay. On door are 20 Bulletin 800T oiltight push buttons and pilot lights.



MANUAL and AUTOMATIC COMPONENTS for *Trouble Free* Control Panels

Automatic control panels must be reliable . . . not just MOST OF THE TIME but ALL OF THE TIME. The failure of only one component . . . JUST ONCE . . . may be costly in spoilage and production delay.

A-B controls continue in first place in dependable switching because they are so simple. They have no troublemaking pivots, pins, or bearings to gum up and stick. Their double break, silver alloy contacts never require maintenance until all contact material has been worn away.

Specify Allen-Bradley controls for your machines. Send for the A-B Handy Catalog.

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Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd.
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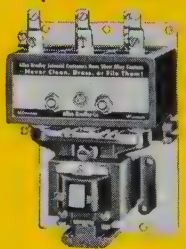
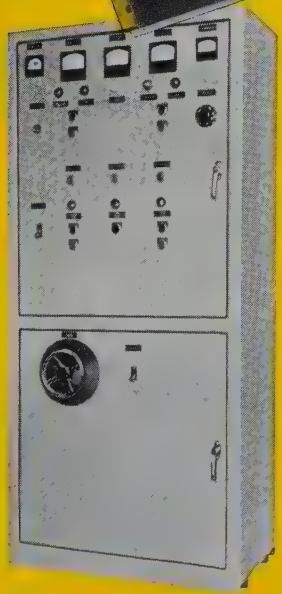
Bulletin 849
pneumatic timer



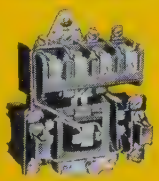
Bulletin 702
Size 2 contactor



BETA dust precipitator control cabinet with A-B oiltight push buttons

Bulletin 700
universal relay

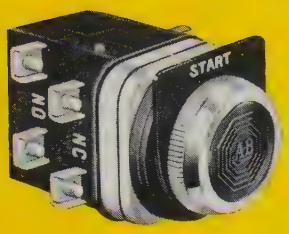
Bulletin 609
manual starter



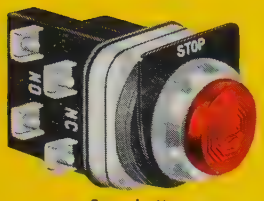
Bulletin 709
solenoid starter

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

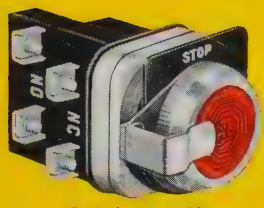
5-55-R



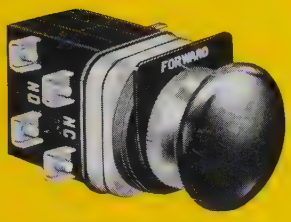
Start button



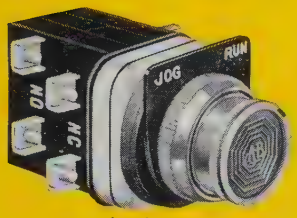
Stop button



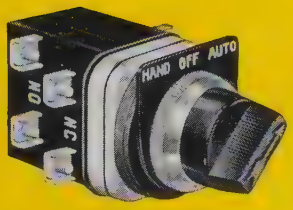
Stop button with locking attachment



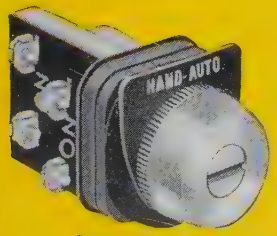
Mushroom head button



Jog button

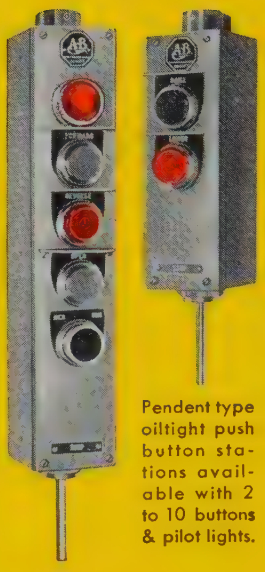


Selector switch



Coin slot selector

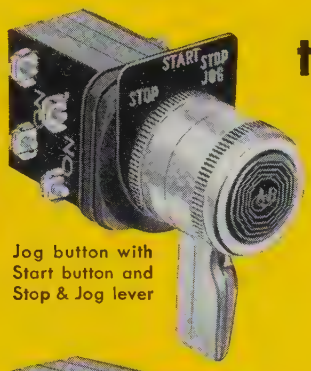
Open view of 2-button oiltight master station showing method of mounting



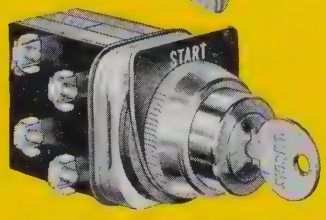
Pendent type oiltight push button stations available with 2 to 10 buttons & pilot lights.

ALLEN-BRADLEY OILTIGHT PUSH BUTTON LINE

that *Satisfies Every Requirement*



Jog button with Start button and Stop & Jog lever



Cylinder lock button

Potentiometer unit

Pilot light Transformer type

Here are a few Allen-Bradley oiltight push button units for machine tools that can be used in endless combinations. All have a flexible, oiltight diaphragm between button and contact block to exclude oil or cutting fluids from contacts. The silver contacts are maintenance free.

Contact blocks may be assembled interchangeably with any type of button. They are available with 1 NO-NC; 2 NO-NC; 4 NO-NC; 2 NO; or 2 NC contacts. Pilot lights of matching design are standard items. See the A-B Handy Catalog for details.

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wis.

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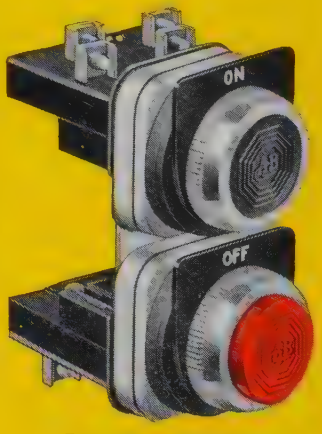
Galt, Ont.



Two-button maintained contact button

5-55-R

A-B Quality

ALLEN-BRADLEY QUALITY

BULLETIN 800T PUSH BUTTONS

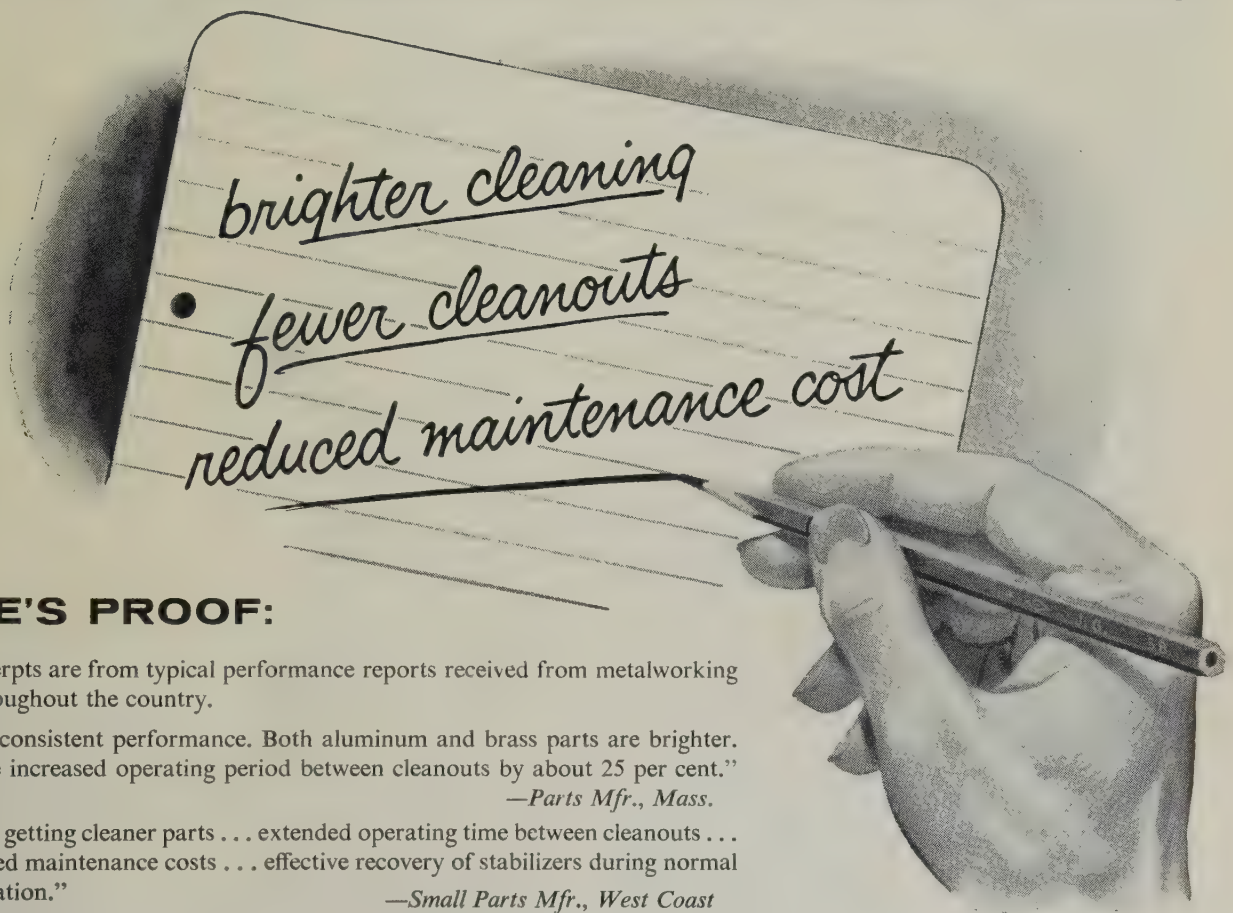
SAVINGS ADD UP

with all-purpose

"TRICLENE"® D

TRICHLORETHYLENE

Du Pont's Vapor Degreasing Solvent for Metal Cleaning



HERE'S PROOF:

These excerpts are from typical performance reports received from metalworking plants throughout the country.

"Fine, consistent performance. Both aluminum and brass parts are brighter. We've increased operating period between cleanouts by about 25 per cent."
—Parts Mfr., Mass.

"We're getting cleaner parts . . . extended operating time between cleanouts . . . reduced maintenance costs . . . effective recovery of stabilizers during normal distillation."
—Small Parts Mfr., West Coast

"In cleaning small aluminum, silver, copper alloy and zinc and stainless steel parts . . . cleanout time of degreaser and still has been cut by one-third."
—Appliance Mfr., Indiana

"Degreased parts are brighter and cleaner. Chemical control of solvent greatly simplified and . . . we have peace of mind."
—Airplane Producer, Los Angeles

Use the coupon for more information about "Triclene" D—the best vapor degreasing solvent for *any* class work.

New All-Purpose

"TRICLENE" D

Trichlorethylene

DUPONT

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

SEND FOR THIS NEW DESCRIPTIVE FOLDER

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Electrochemicals Department S-52, Wilmington 98, Del.

☐ Please send me your descriptive folder on new, all-purpose "TRICLENE" D.
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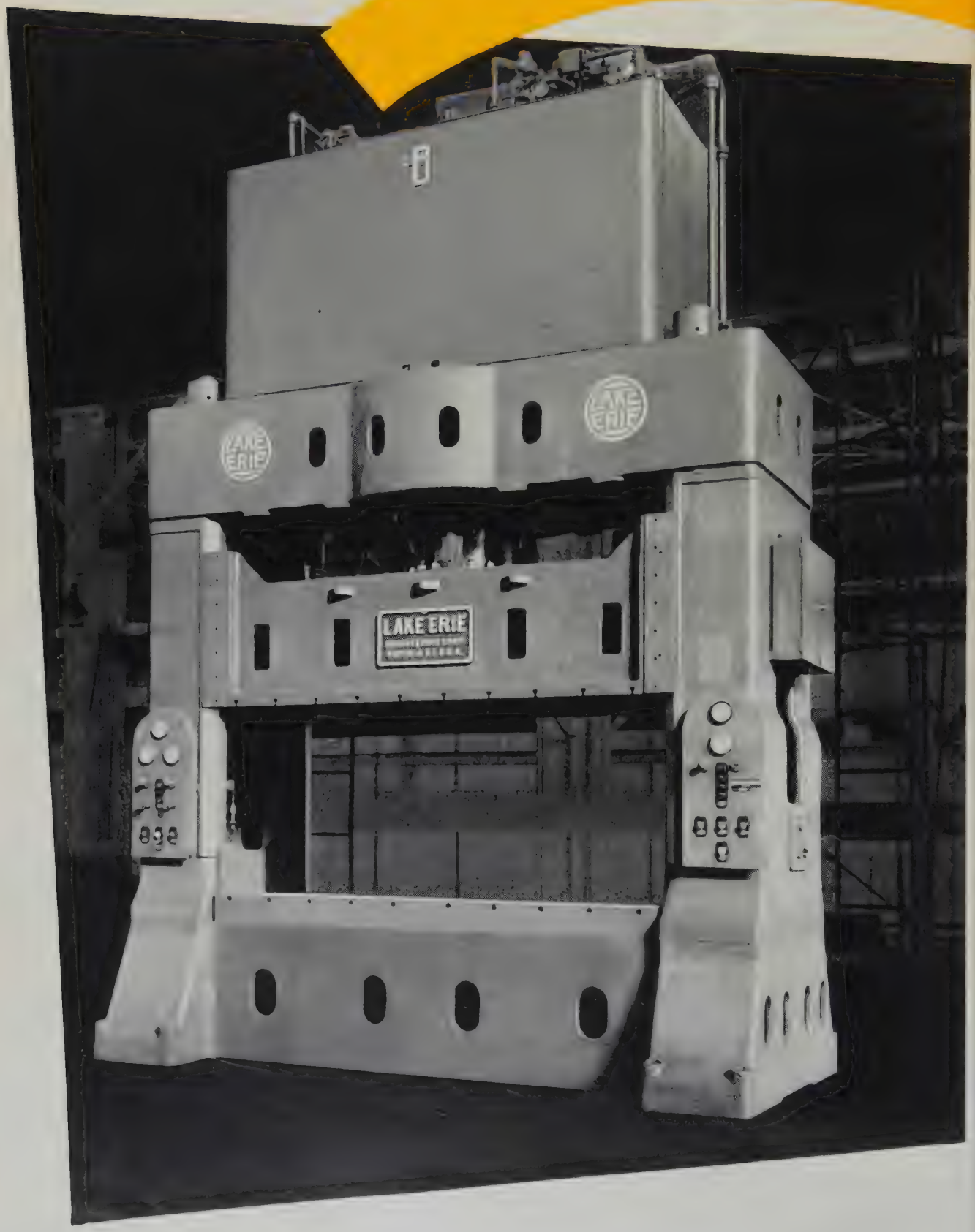

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FORGED STEEL CYLINDERS... *solve problem of defective integral castings.*

HEAVIER SECTIONS... *mean lower stresses.*

LAPPED CYLINDERS AND PISTONS... *insures precision fit.*

QUICK-SET STROKE CONTROLS... *save time on set-ups.*

UNUSUALLY RUGGED SIDE HOUSINGS... *increase frame rigidity.*

FAIL-SAFE DEVICES... *in electric and hydraulic circuits.*

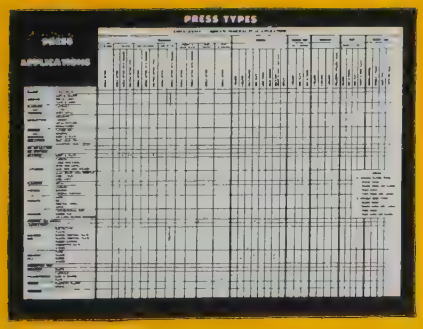
SIMPLIFIED ELECTRICAL SYSTEM... *designed for maximum safety and ease of maintenance.*

BRONZE USED EXTENSIVELY... *bronze throat bushings provide better guiding.*

... *bronze piston heads, gland bushings, and pre-fill valve disc prevent scoring.*

LAKE ERIE BUILDS THEM BETTER... Mechanically, electrically, and hydraulically, Lake Erie presses bring you the greatest number of superior features. That's why Lake Erie press users almost always return to us for additional presses. They know from experience that Lake Erie incorporates many "special" features as "standard"... features which seldom if ever form a part of customer specifications. They know that these features mean longer press life, minimum maintenance, maximum productivity. Next time, call on Lake Erie.

SEND FOR HANDY BUYER'S GUIDE ➧

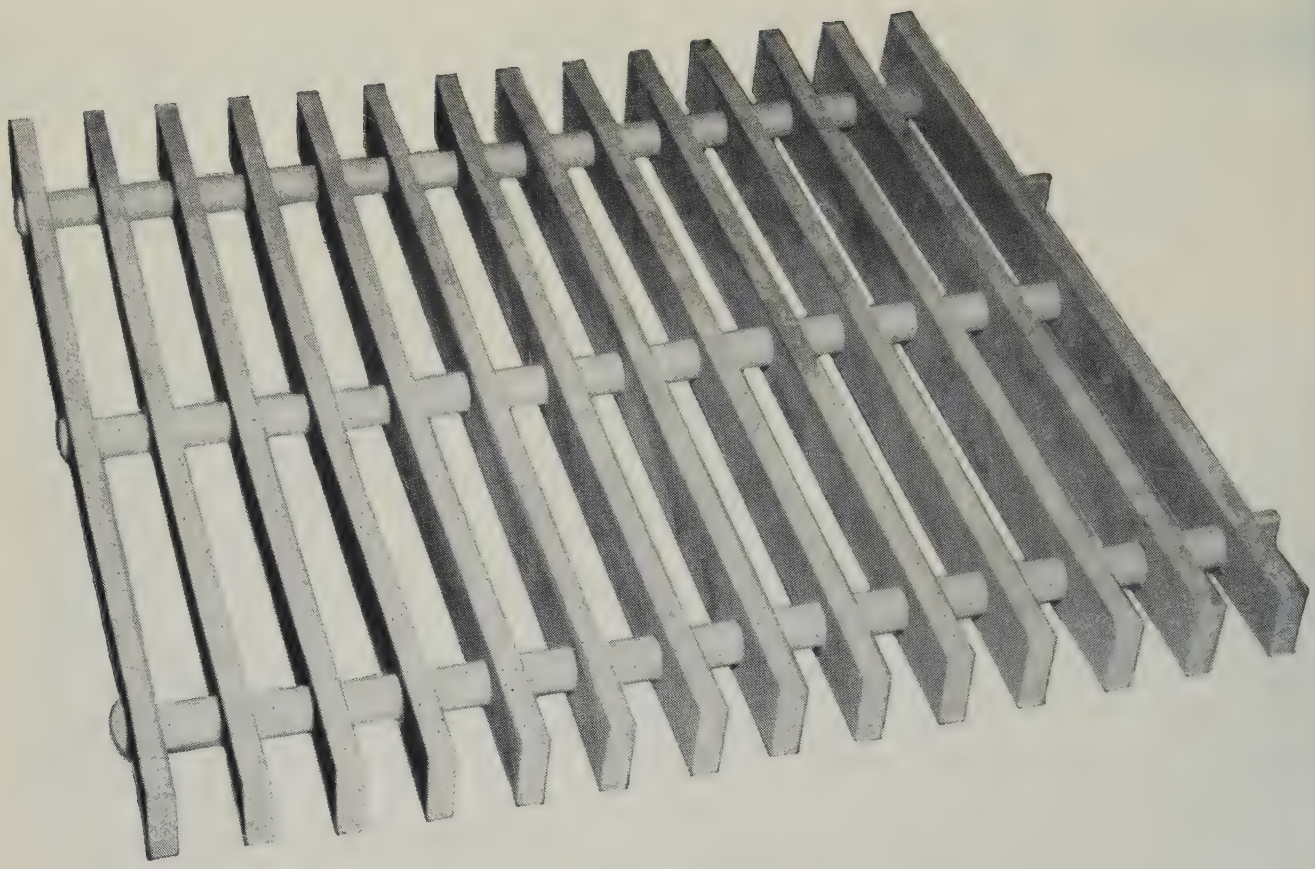


LAKE ERIE HYDRAULIC PRESSES

EXTRUSION PRESSES • DIE CASTING MACHINES
ROLLING MILL AUXILIARY EQUIPMENT

LAKE ERIE ENGINEERING CORP. *General Offices and Plant: 882 Woodward Ave., Buffalo 17, N. Y*
District Offices in New York, Chicago, Detroit, Pittsburgh
Representatives in Other U. S. Cities and Foreign Countries

LAKE ERIE®



STILL LIKE NEW

. . . After 100 Operations at 2300 deg. F

This tray made of HASTELLOY alloy X has been heated to 2300 deg. F on more than 100 different occasions and still shows no signs of oxidation or distortion. In each cycle the tray is heated to 1300 deg. F for an hour, and then to 2300 deg. F for an additional half hour. Trays made from other materials, and used under the same conditions, failed from oxidation and warpage after a few firing cycles.

The tray is 18 in. square and is fabricated from HASTELLOY alloy X sheared plate. It is used to support heavy molds during a tungsten carbide bonding process.

HASTELLOY alloy X has given similar good service in other furnace applications such as muffles, flame targets, rollers, and heating tubes. It is equally suitable for use in jet engine tailpipes, afterburner components, and other aircraft parts exposed to heat and oxidation.

For complete information on properties and forms, ask for the booklet, "HASTELLOY Alloy X."

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Sales Offices

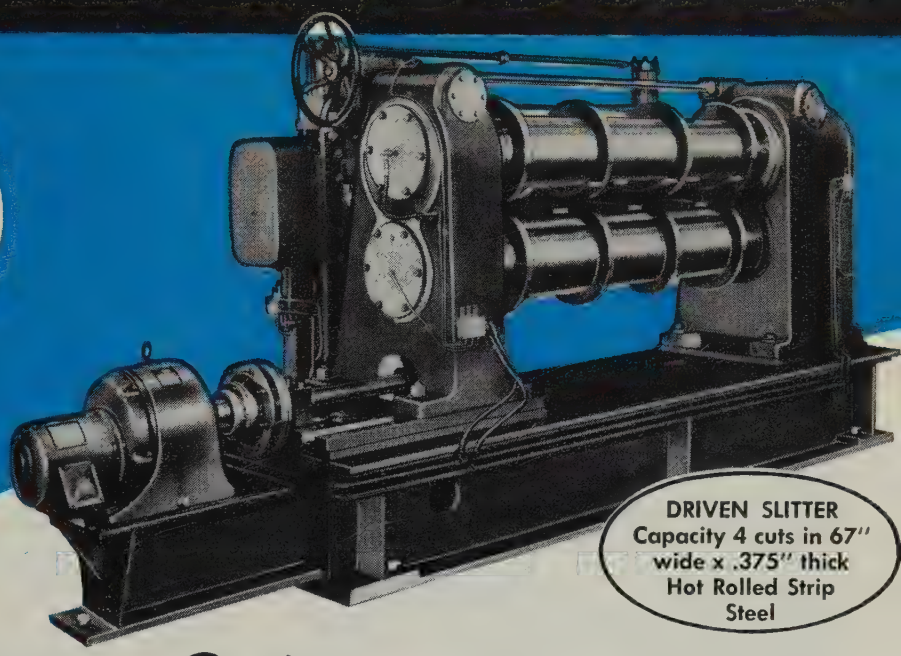
Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Hastelloy" is a registered trade-mark of Union Carbide and Carbon Corporation.

"YOUNGSTOWN"

as the correct
nswer to your
Slitting Problem

Whether it is .002" Brass, Copper, Aluminum, or 3/8" Steel Plate — your requirements are exactly met.



DRIVEN SLITTER
Capacity 4 cuts in 67" wide x .375" thick Hot Rolled Strip Steel

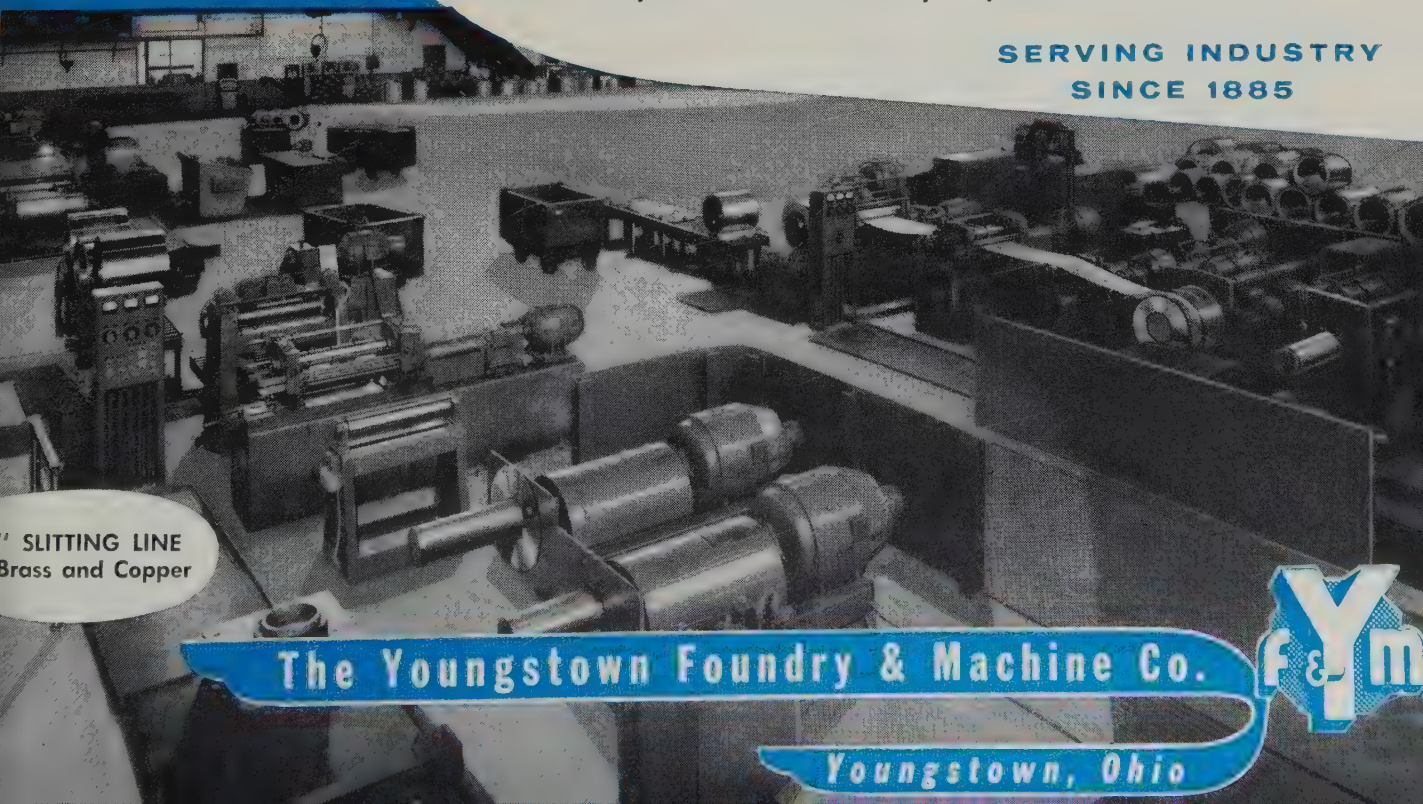
- SLITTERS AND SLITTING LINES
- PAY OFF REELS
- TAKE UP REELS
- UP CUT SHEARS
- UP COILERS
- UNCOILERS
- COIL CARRIAGES
- SCRAP BALLERS

and other Strip Mill Machinery

Precision Built Lines Engineered to Your Needs and Specifications

Savings are substantial when you "slit your own" and more so with equipment built exactly right for the job. Whether you slit non-ferrous or ferrous metals — light or heavy—thin or thick strip—it will pay you to investigate "Youngstown" slitting lines before you buy. Seventy years of experience is back of the designing, engineering and building of "YF&M" slitters and auxiliary equipment. Many installations for leading producers, fabricators and warehouses, offer proof of dependable, economical, profitable operation . . . evidence of our ability to supply the 100% correct answer to satisfy your individual requirements. Just tell us your problem!

SERVING INDUSTRY
SINCE 1885

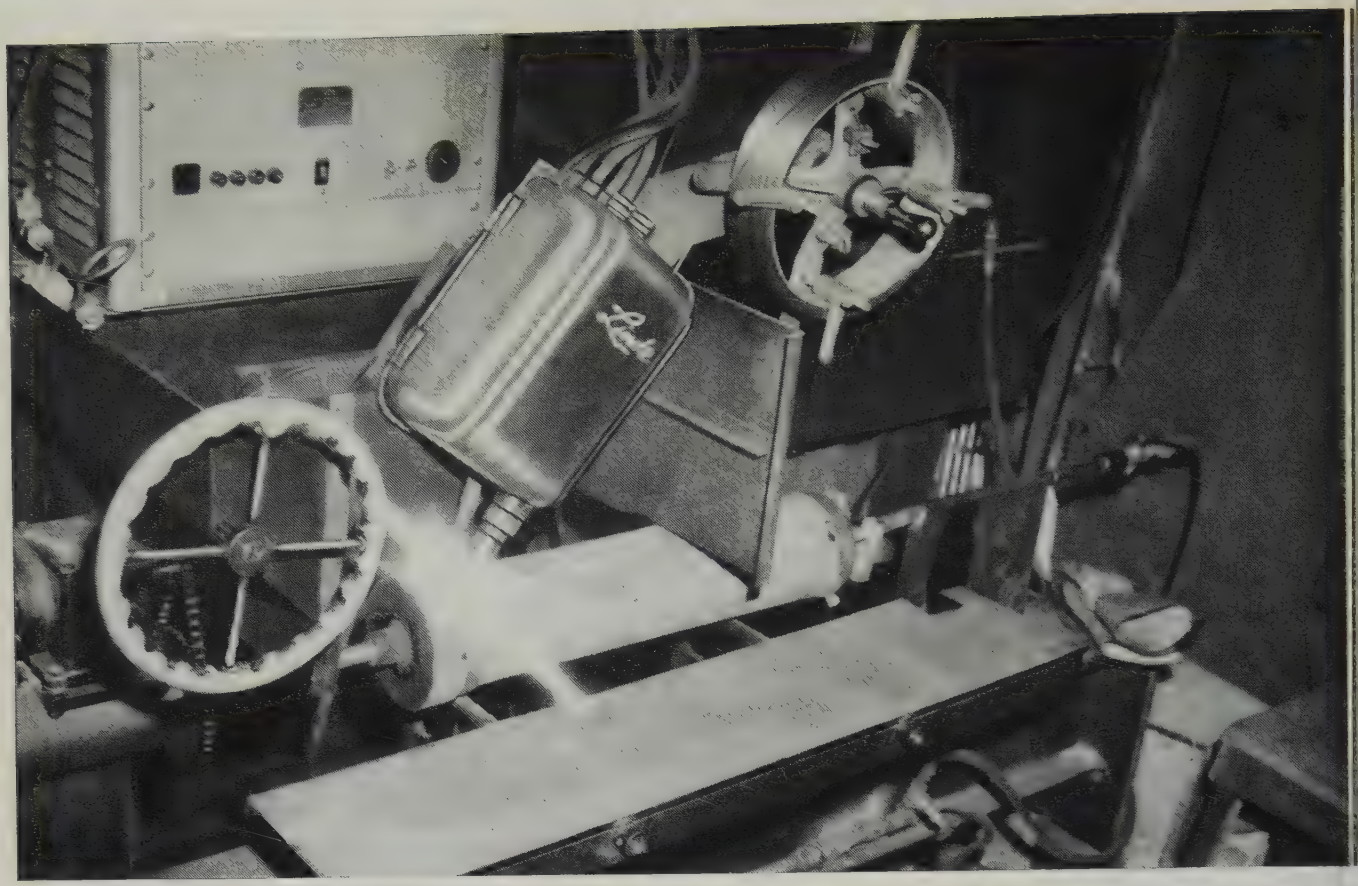


" SLITTING LINE
Brass and Copper

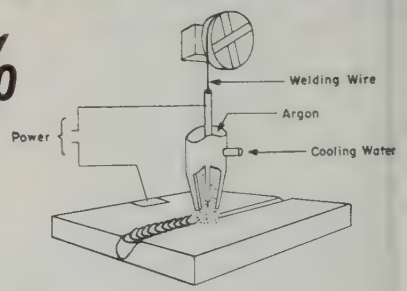
The Youngstown Foundry & Machine Co.

Y F & M

Youngstown, Ohio



Sigma Welding...Cuts Costs 36% Ups Steel Fabrication 93%



By shifting from manual arc welding to mechanized sigma welding, production of 31-in. long, 11-ga. steel condensers was almost doubled—costs were cut over a third—and unit quality greatly improved. These sigma welded condensers have been tested to hydrostatic pressures of 2,800 lb. per sq. in. with no sign of failure.

All completed condensers are subject to an air pressure test under water, and a supersensitive electronic leak detector . . . Rejects have been practically eliminated by sigma welding. Like many other products throughout industry, these condensers are being fabricated faster and more economically than ever before. Here are some sigma welding features—

- Uses any standard d.c. or constant potential power supply. With c.p., no control is necessary to maintain constant arc voltage, starting is faster and operations more efficient.
- Makes smooth welds in all type joints—on all commercially fabricated metals.
- Welding speeds exceed 100-in. per minute in many operations . . . And sigma welding joins metals up to ¼-in. thick in one pass. Start saving now, call your local LINDE representative for more information—and ask for Form 7942 "Modern Methods of Joining Metals."

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited, Toronto
The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

CALENDAR
OF MEETINGS

May 1-4, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 11 S. LaSalle St., Chicago 3, Ill. Secretary: Arthur C. Kreutzer.

May 1-4, National Metal Trades Association: Western plant management conference, French Lick Springs hotel, French Lick, Ind. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

May 1-5, Electrochemical Society Inc.: Spring meeting, Sheraton-Gibson hotel, Cincinnati. Society's address: 216 W. 102nd St., New York 25, N. Y. Secretary: Dr. Henry B. Linford.

May 4-6, American Management Association: Insurance conference, Hotel Statler, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

May 4-6, International Aviation Trade Show: 69th Regiment Armory, New York. Information: Aircraft Trade Shows Inc., Hotel McAlpin, New York 1, N. Y.

May 4-7, National Screw Machine Products Association: Annual meeting, Hotel Statler, Buffalo. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive secretary: Orrin B. Werntz.

May 5-6, Investment Casting Institute: Spring meeting, Park Sheraton hotel, New York. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

May 7-15, Society of the Plastics Industry Inc.: Annual meeting and conference, cruise on *Queen of Bermuda*. Society's address: 67 W. 44th St., New York 36, N. Y. Executive vice president: William T. Cruse.

May 8-11, Automotive Engine Rebuilders Association: Annual meeting, Hotel Cleveland, Cleveland. Association's address: 419 N. Capitol Ave., Indianapolis 4, Ind. Executive vice president: R. G. Patterson.

May 8-11, National Industrial Advertisers Association: Annual meeting, Sheraton Park hotel, Washington. Association's address: 1776 Broadway, New York 19, N. Y. Executive secretary: Blaine G. Wiley.

May 9-11, Metal Treating Institute: Spring meeting, Ambassador hotel, Los Angeles. Institute's address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

May 10-12, Metal Powder Association: Annual meeting and exhibit, Bellevue-Stratford hotel, Philadelphia. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

May 11-13, National Association of Sheet Metal Distributors: Spring meeting, Hotel Cleveland, Cleveland. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: Thomas A. Fernley Jr.

May 15-18, Copper & Brass Research Association: Annual meeting, the Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: F. L. Riggin Sr.

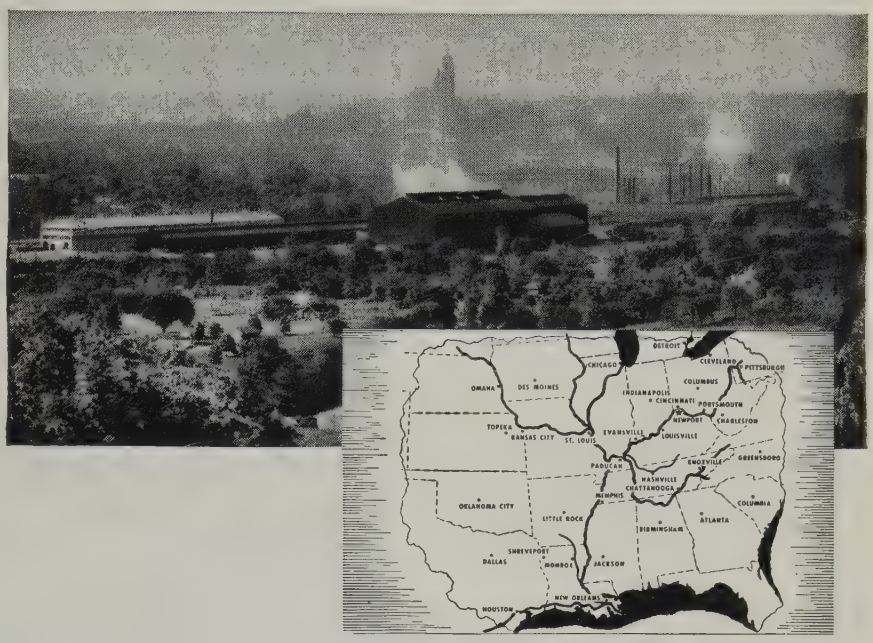
May 16-17, American Management Association: Special conference on collective bargaining, Commodore hotel, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

May 16-18, Industrial Heating Equipment Association Inc.: Spring meeting, the Homestead, Hot Springs, Va. Association's address: 412 Fifth St. N.W., Washington, D. C. Secretary: T. F. Sheckels.

May 16-19, American Mining Congress: Coal convention and exposition, Cleveland Public Auditorium, Cleveland. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

May 16-20, Materials Handling Exposition & Conference: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Newport Steel IN THE HEART OF INDUSTRIAL GROWTH



ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads, 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

Your proximity to this mill in the nation's fastest growing industrial area gives you money-saving short hauls by rail, truck or river barge. A new cold-reduction mill now complements many other modern facilities which more than double Newport's ingot capacity and greatly increase its variety of products and range of grades. At this customers' mill, also, every order receives that extra measure of personal attention that makes the quality of the service equal that of the steel itself. Check this list of products; get in touch with Newport before you buy.

PRODUCTS OF NEWPORT STEEL

Cold-Rolled Sheets
Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
Hot-Rolled Sheets
Hot-Rolled Pickled Sheets
Galvanized Sheets
Galvannealed Sheets
Colorbond Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
Roofing and Siding
Eave Trough and Conductor Pipe
Culverts

Newport Steel CORPORATION
NEWPORT, KENTUCKY

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

Are you now using the most efficient coal for your purpose?

LET OUR TECHNICAL SERVICE ADVISE YOU!

No two plants are alike—design and equipment characteristics make the difference. That's why it's so important to consider *kind* and *size* when selecting a coal for your particular burning equipment. The B&O Technical Service is prepared to study your specific problem and help you choose the correct coal. Here's what our service does for you:

- outlines Bituminous coals available for your plant.
- discusses the merits of these coals.
- establishes current and predicts future relative values of these coals.
- determines the best coal for your system.
- suggests the most efficient way to burn this coal.
- supplies case histories of actual savings in fuel costs.

Ask our man! Write:
COAL TRAFFIC DEPARTMENT
BALTIMORE & OHIO RAILROAD
BALTIMORE 1, MARYLAND

BITUMINOUS MEANS DEPENDABILITY!

Reserves will be available for centuries to come. Cost will remain low and stable thanks to modern mining practices.

LINKING 13 GREAT STATES WITH THE NATION
B&O

Baltimore & Ohio Railroad

Constantly *doing things*—better!

BITUMINOUS COALS FOR EVERY PURPOSE

DoALL COMPANY ENGINEERS GET...

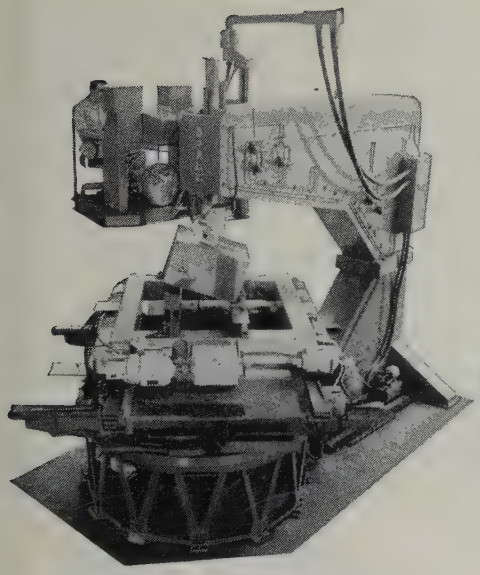
HIGH STRENGTH

with NO HEAT TREAT DISTORTION

by specifying

STRESSPROOF®

SEVERELY COLD-WORKED, FURNACE-TREATED STEEL BARS



The new giant DoALL Contourmatic band saw — the world's largest — is a key part of the Air Force's "Heavy Press Program." STRESSPROOF is used on important operating parts.

on key operating parts

The lead and feed screws on the new DoALL Contourmatic must be strong since they transmit power. These important lead and feed screws must also be straight and free from growth and shrinkage, since upon their accuracy depends the accuracy of the huge extrusion dies machined on the saw. STRESSPROOF gives them this strength and accuracy.

STRESSPROOF was specified because it eliminates heat treating and its attendant distortion and warpage problems. In addition, STRESSPROOF wears well, has the necessary strength and is easily machined.

STRESSPROOF makes a better part at lower cost.

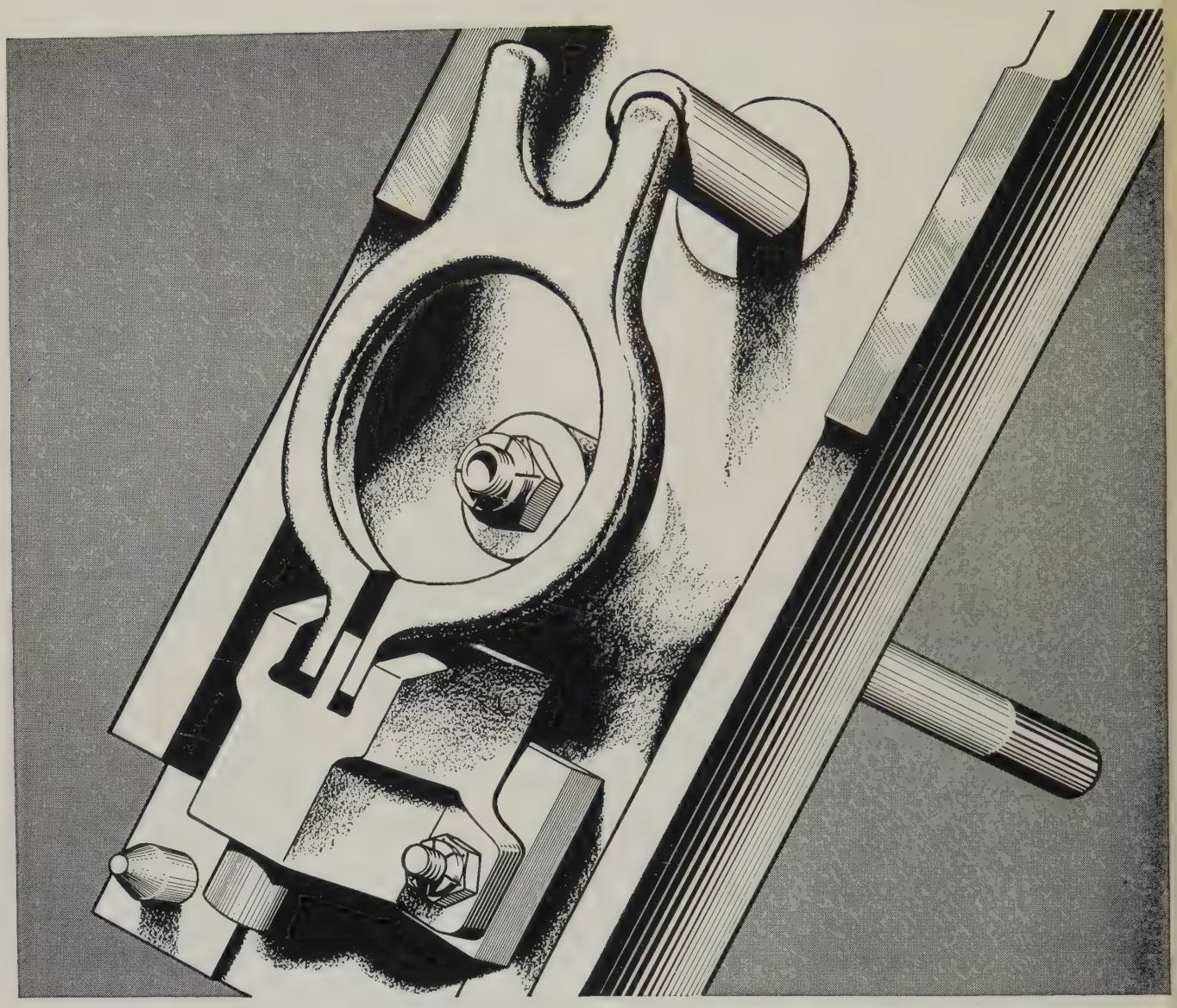
Write for helpful data bulletin No. 15 . . . "Improve Quality — Cut Costs"

AVAILABLE FROM LEADING STEEL DISTRIBUTORS COAST-TO-COAST

La Salle STEEL CO.

1414 150th Street, Hammond, Indiana

MANUFACTURERS OF AMERICA'S MOST COMPLETE LINE OF QUALITY COLD-FINISHED STEEL BARS



MORE AND MORE FLEXLOC LOCKNUTS are being used on assemblies where dependable locking is essential to the operating efficiency of the equipment. This stationary spindle is a good example of the difficult jobs FLEXLOC locknuts are doing throughout industry.

FLEXLOCS were put on this unit after a number of other locknuts had failed to keep the spindles tight. Even the high humidity, extreme vibration, and presence of lint and grease have not loosened the FLEXLOCS.

FLEXLOC Self-Locking Nuts—one piece, all metal—are available in a full range of sizes in any quantity. Standard FLEXLOCS are stocked by leading industrial distributors everywhere. Write for Bulletin 866 and samples. STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

DO YOU KNOW? Standard FLEXLOCS smooth off rough bolt threads. The locking threads on all-metal FLEXLOCS are not chewed up when used on rough bolts.

Standard FLEXLOCS lock securely on bolts varying in diameter tolerances. The all-metal, resilient locking sections of the nut accommodate themselves to the diameter tolerances.

Standard FLEXLOCS are one piece, all metal. They are not affected by temperatures to 550°F. Nuts lacking these features have a more restricted temperature range.

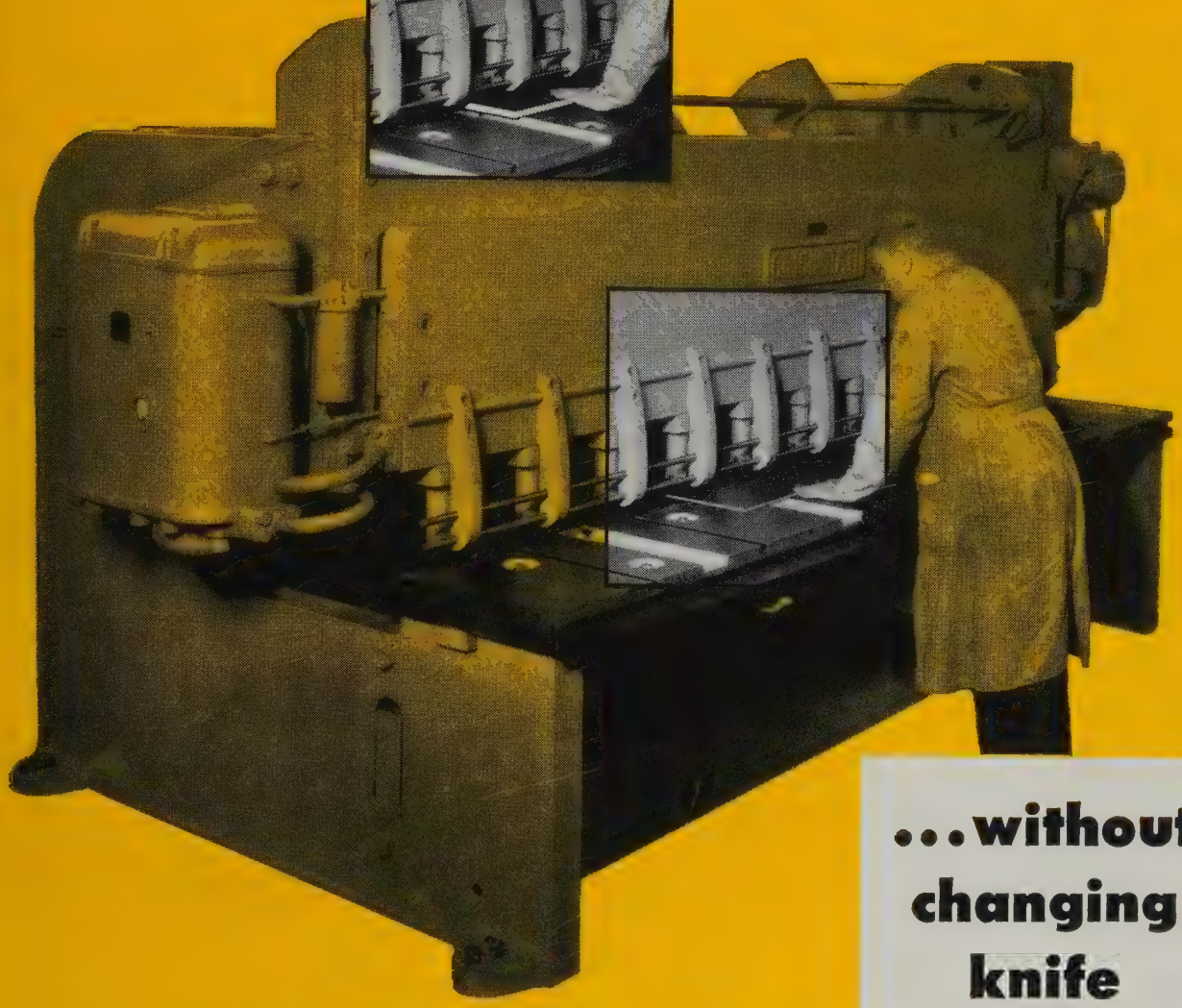
Standard FLEXLOCS lock securely—stopped or seated—when 1½ threads of a standard bolt are past the top of the nut.

Standard FLEXLOCS are not affected by moisture, oil, dirt or grit. They lock efficiently under all conditions, regardless of the vibration encountered.

FLEXLOC®
LOCKNUT DIVISION
SPS
JENKINTOWN PENNSYLVANIA

CINCINNATI accurately shears

1/2" plate... and 20 gauge sheets



...without changing knife clearance

... You do not change knife clearance for successful shearing of different thicknesses on a Cincinnati. Just set the clearance for the thinnest material and shear all thicknesses up to capacity. Thousands of Cincinnati Shears are used continuously in this manner. This practical method prevents accidental damage—saves time. Remember, changing knife clearance interrupts production.

Sharp knives are a necessity for satisfactory shearing, especially on very light gauges. Remember, changing knife clearance does not sharpen dull knives. We suggest you write for data sheet on knife life.

Write for Catalog S-6 ... describing Cincinnati Shears

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

Twenty-foot boring mill table turned upside down to show the Farrel ring gear.

gives driving smoothness to boring mill table

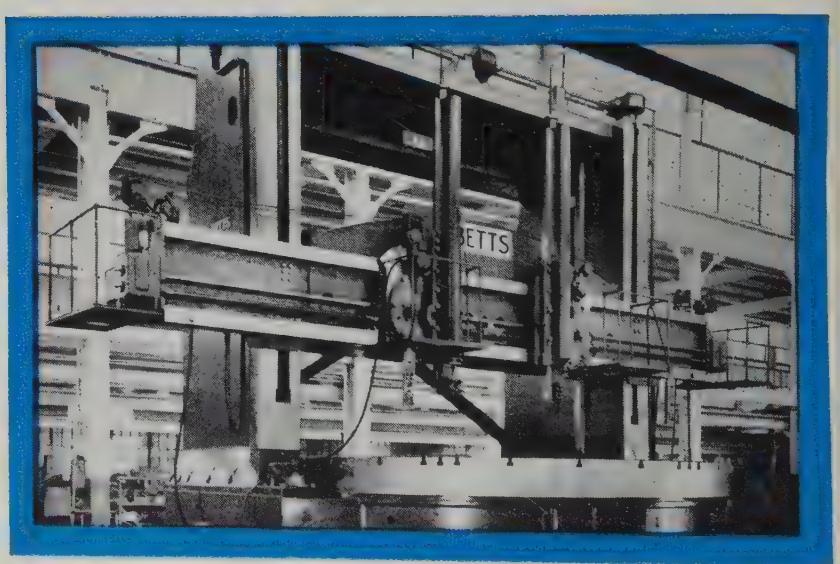
The huge single-helical ring gear built into this twenty-foot boring mill table is an important factor in obtaining an extremely fine finish on work turned on the mill.

Designed to impart driving smoothness to the table, both the gear and its mating pinion are precision generated by Farrel to a high degree of accuracy, and carefully fitted to eliminate the possibility of backlash. The pinion shaft is worm driven and this, together with the wide-angle helical gear, provides a smooth, chatter-free drive.

The gear, which is split, has a 30° right-hand helix angle, 276 teeth, 1½ DP. Its inside diameter is 183.294" and the face is 9¾" wide.

Farrel precision-generated internal gears are available with either helical or spur teeth in sizes up to 16 feet diameter, 12 inch face, ¾ DP. They are made of the finest grade materials.

Farrel engineers will be glad to assist you in working out unusual gear problems. Why not call on them?



The table is used on this Betts boring mill, made by Consolidated Machine Tool Corporation, Rochester, N. Y.

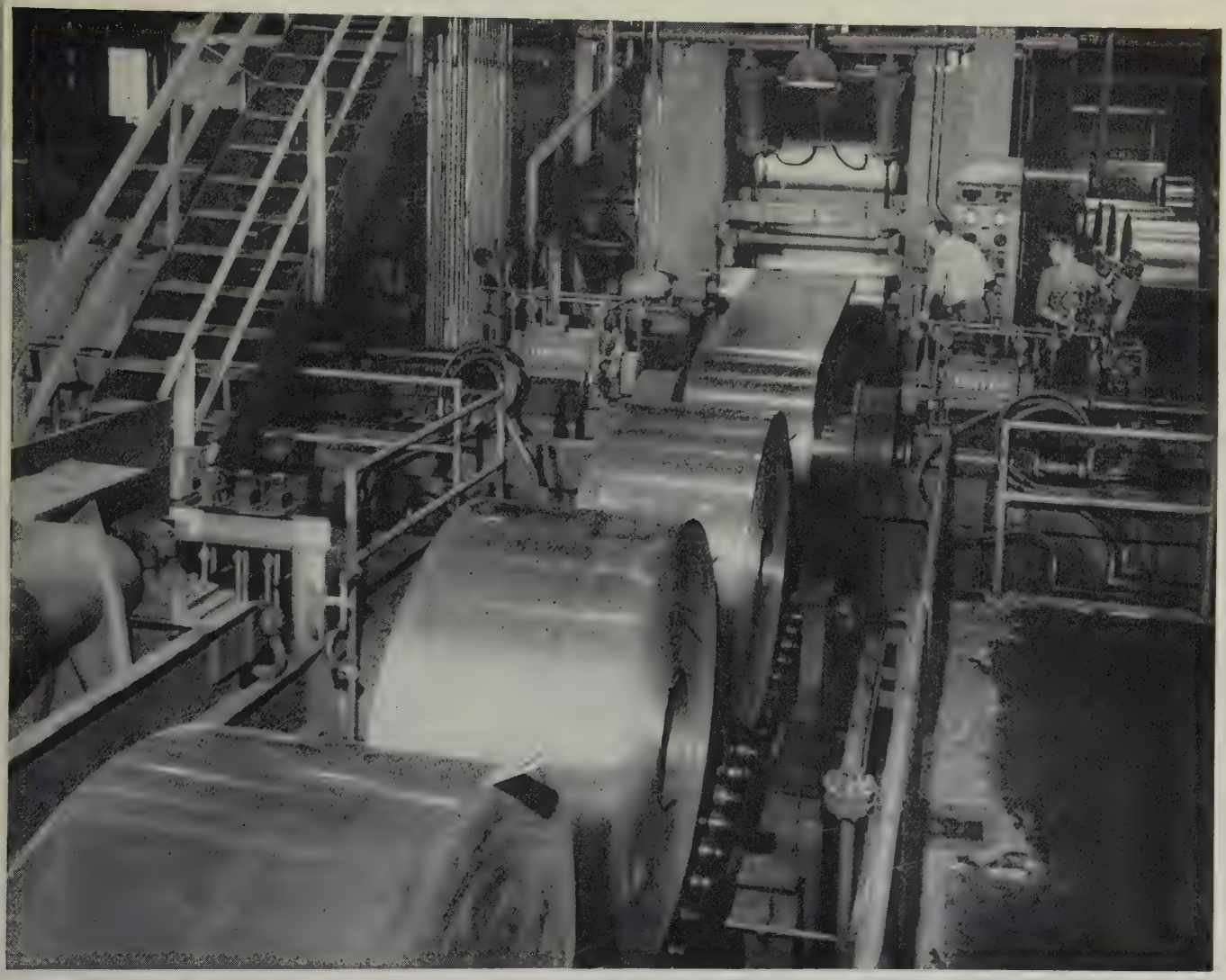
FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Detroit, Chicago, Memphis, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

FB-940

Farrel-Birmingham®

Let's discuss your requirements NOW for cold rolled sheets and strip



Tempering sheets in our new cold-rolled mill, Indiana Harbor Works, East Chicago, Ind.

●Our new continuous cold-reduced mill at East Chicago is turning out the finest sheets and strip that modern equipment can produce. And we are running on a full schedule to meet the heavy demand.

But more and more customers want more and more sheets. Our output is booked for weeks ahead, so you can help us to help you by letting us know your requirements right away.

Let's discuss your sheet and strip problems. Call our nearest District Sales Office now.

QUALITY V YOUNGSTOWN SERVICE

Youngstown

COLD ROLLED SHEETS AND STRIP

THE YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon, Alloy and Yoloy Steel

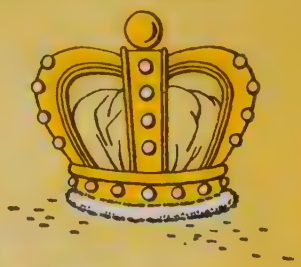
General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Carbide grinding's

Norton Vitrified Bonded Diamond Wheels feature fast stock removal and high resistance to grooving. Long service life is another big advantage, since this Norton-developed bond holds each diamond tightly, for maximum useful cutting action. *Typical Applications:* production grinding of single-point carbide tools; grinding chip breakers; cylindrical, surface and internal precision grinding of carbide tools, cutters, discs, gages, rolls, etc.

Norton Resinoid Bonded Diamond Wheels are made in two bond types — regular, for wet grinding and B6, for dry grinding. Each type gives you extra fast cutting action and long, money-saving wheel life. *Typical Applications:* grinding multi-tooth cutters, where their size-holding ability assures uniform height to each cutter tooth; cutting-off damaged carbide tools for salvage; grinding threads "from the solid" in carbide taps and thread gages.



"CROWN JEWELS"

Norton diamond wheels bring unbeatable economy to your production

You buy diamond wheels for carbide grinding as an investment in faster, better grinding performance and lower production costs.

You can be sure of peak profits from this investment when your choice is Norton diamond wheels. Backed by Norton's long leadership in development and manufacture — and by news-making "firsts" in diamond wheel progress — they're carbide grinding's recognized "Crown Jewels", with a royal reputation for the best in diamond wheel value!

"CROWN JEWEL" Highlights

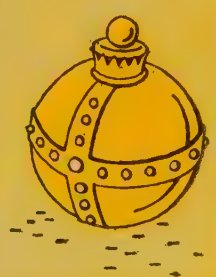
***NORTON:** was first to introduce resinoid, metal and vitrified bonded diamond wheels . . . does all its own sizing, grading and laboratory checking of diamonds . . . duplicates wheel specifications with constantly controlled accuracy, to assure you uniform top performance . . . brings you a complete line, covering every diamond wheel application in every field — carbide, stone, glass, ceramics, etc. . . . gives you fast service from full stocks in Worcester, five warehouses and Distributor's stocks.*

Your Norton Distributor

is ready with quick deliveries of the diamond wheels you need for better, more economical carbide grinding. Ask him for the 142-page illustrated booklet, *Grinding Carbide Tools,* and the complete net priced Diamond Wheel Catalog or write for them direct. And remember: only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

Making better products . . . to make your products better

Norton Metal Bonded Diamond Wheels are engineered by Norton for top savings on certain grinding jobs where great durability and resistance to grooving, rather than a fast rate of cut, are the chief requirements. *Typical Applications:* sharpening single-point carbide tools; reconditioning dull or chipped carbide tools; cutting-off sintered carbide blanks and a great variety of other materials — glass, porcelain, germanium, cermets and stone.



W-1614

NORTON

and its BEHR-MANNING division

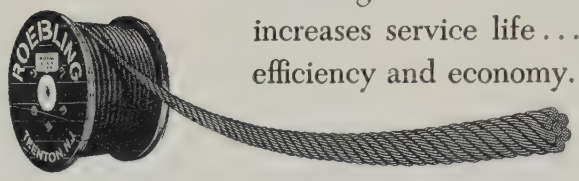
NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

NOW! SLASH WIRE ROPE COSTS WITH ROEBLING'S NEW

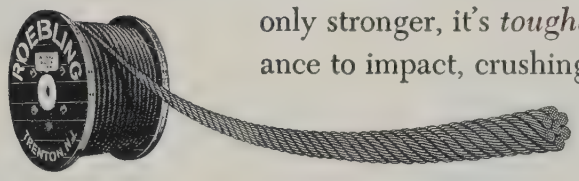
Royal 1105 Blue

15% STRONGER THAN YESTERDAY'S STANDARD

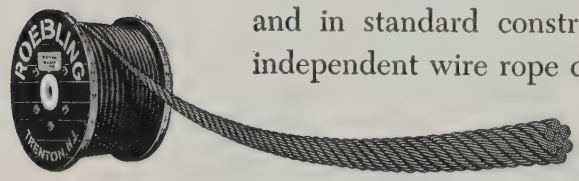
MADE OF ROEBLING'S NEW TYPE 1105 WIRE—the finest rope wire—Roebling **ROYAL BLUE** Wire Rope is guaranteed to be 15% stronger than standard wire ropes of the same size and construction.



Roebling **ROYAL BLUE** Wire Rope vastly increases service life . . . brings unprecedented efficiency and economy.



Roebling **ROYAL BLUE** Wire Rope is not only stronger, it's *tougher,* too . . . has top resistance to impact, crushing, abrasion and fatigue.



You'll soon be able to get **ROYAL BLUE** Wire Rope in all diameters from ¼" to 3½" and in standard constructions employing an independent wire rope core.

Get the whole story on Roebling **ROYAL BLUE**—the most important wire rope development in a score of years. Write us, or contact your distributor or nearest Roebling branch office.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

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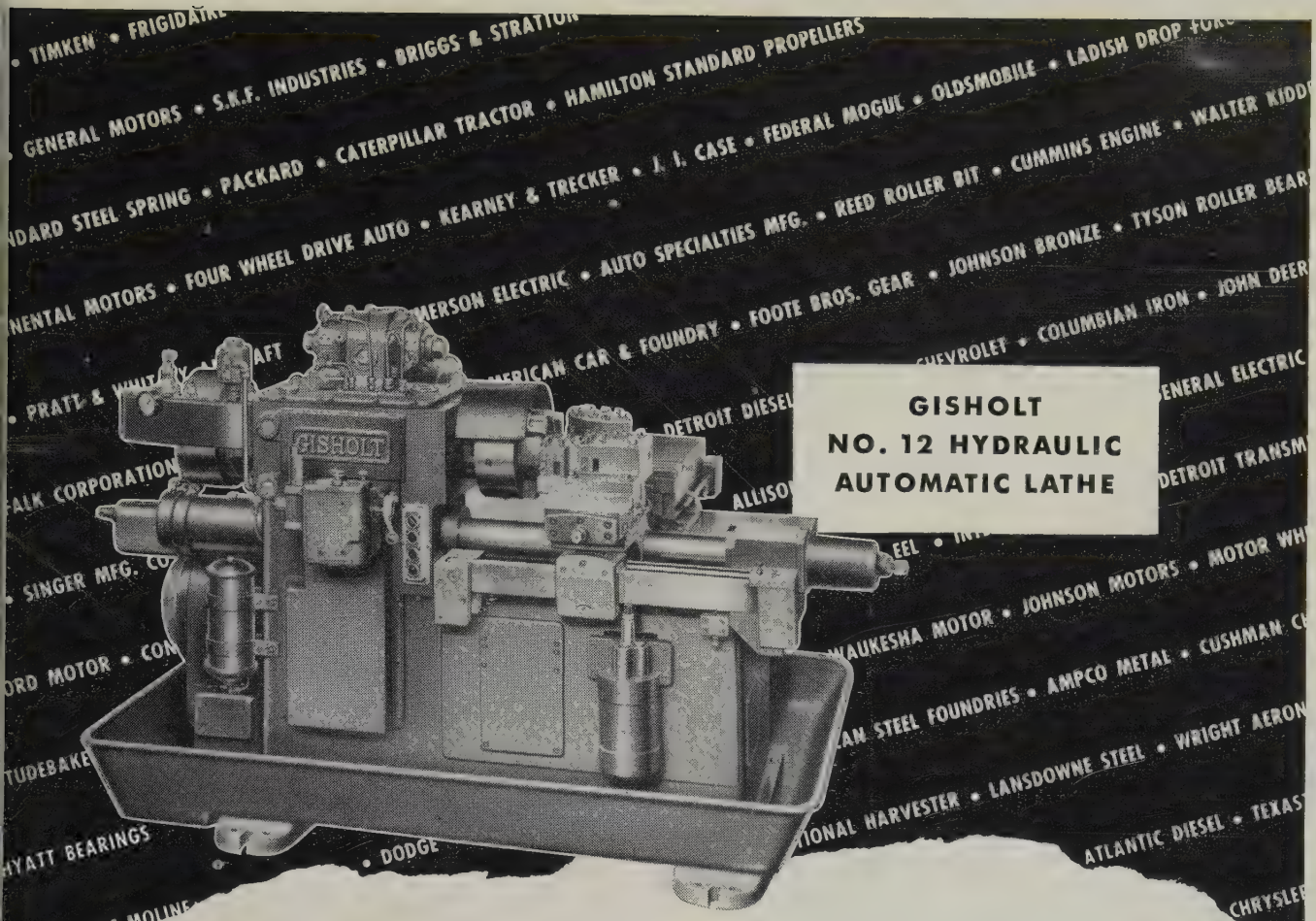


What makes this machine so popular?

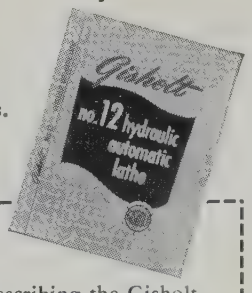
It's the simple basic application of hydraulic principles—perfected through the years. It's a single spindle machine that handles all classes of work—holding with a chuck or an arbor, with fixtures, or with a work driver for between centers. Front carriage alone will perform 14 different cycles. Independent rear slide can be positioned at any angle to the work. Feeds are infinitely adjustable...not limited by cams. Here's the versatility, the speed, the automatic cycle, and the easy change-over that mean big savings for scores of users. Why not for you?

If you have parts up to 12″ to produce at lower cost, look at the Gisholt No. 12 Hydraulic Automatic Lathe. Call your Gisholt representative. Or write us.

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

This new catalog will show you why.

All operating features are clearly described, fully illustrated. Here, too, are 28 different jobs to show many classes of work and tooling possibilities. Write for your copy.



Gisholt Machine Company
Madison 10, Wisconsin

Please send my copy of the catalog describing the Gisholt No. 12 Hydraulic Automatic Lathe.

Name.....*Title*.....

Company.....

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BACKBONE OF A

NATIONAL

THE HYDRAULICALLY-OPERATED TELESCOPING BOOM of this "Industrial Monkey" is comprised of two sections of USS Shelby Seamless Mechanical Tubing—an inner member and an outer member. These "Monkeys" have many uses, including tree trimming, line work, street light servicing, painting, building maintenance and fire fighting.

THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.

DEEP WELL DRILLING demands the utmost in strength of tubul materials. National Seamless is chosen consistently because of ability to resist fatigue, twisting action and collapse. A comple line of National Seamless Drill Pipe, Casing and Tubing is ava able to meet the needs of the Oil Industry.

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Seamless Pipe and Tubes

rom power plants to cross-country pipelines — in ny application where high strength, complete de- endability and long life are mandatory—you're sure o find USS NATIONAL Seamless Pipe and Tubes.

NATIONAL Seamless combines to the highest de- ree the desirable qualities of strength, safety and orkability. Uniform throughout and dimensionally ccurate, NATIONAL Seamless Pipe and Tubes ma- hine cleanly, weld readily, and promise smooth installation and long satisfactory service. They are available in a complete range of steel analyses, wall thicknesses and diameters. And every foot of NATIONAL Seamless is roduced to exacting stand- ards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Regardless of the application, our engineers are interested in discussing the problem with you.

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USS

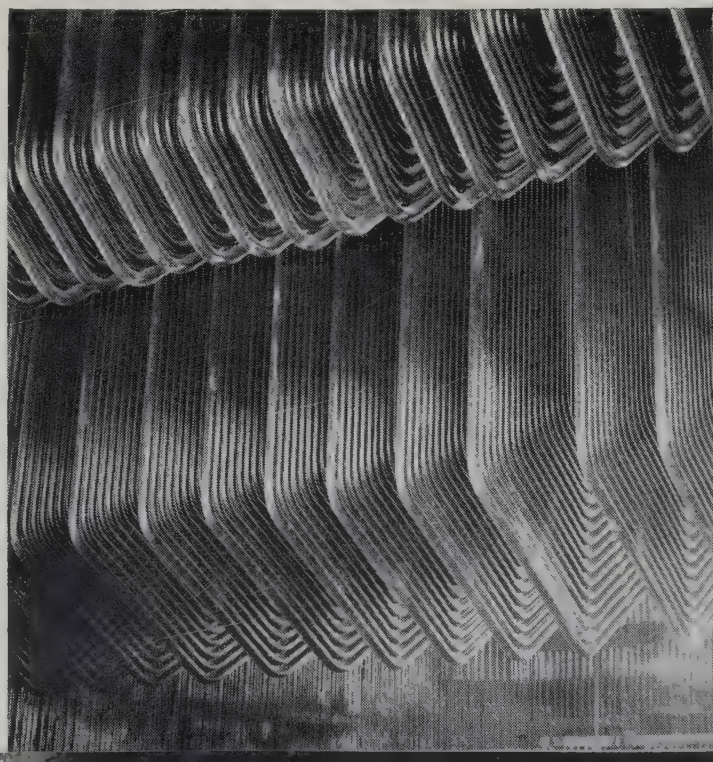
National Seamless Pipe and Tubes

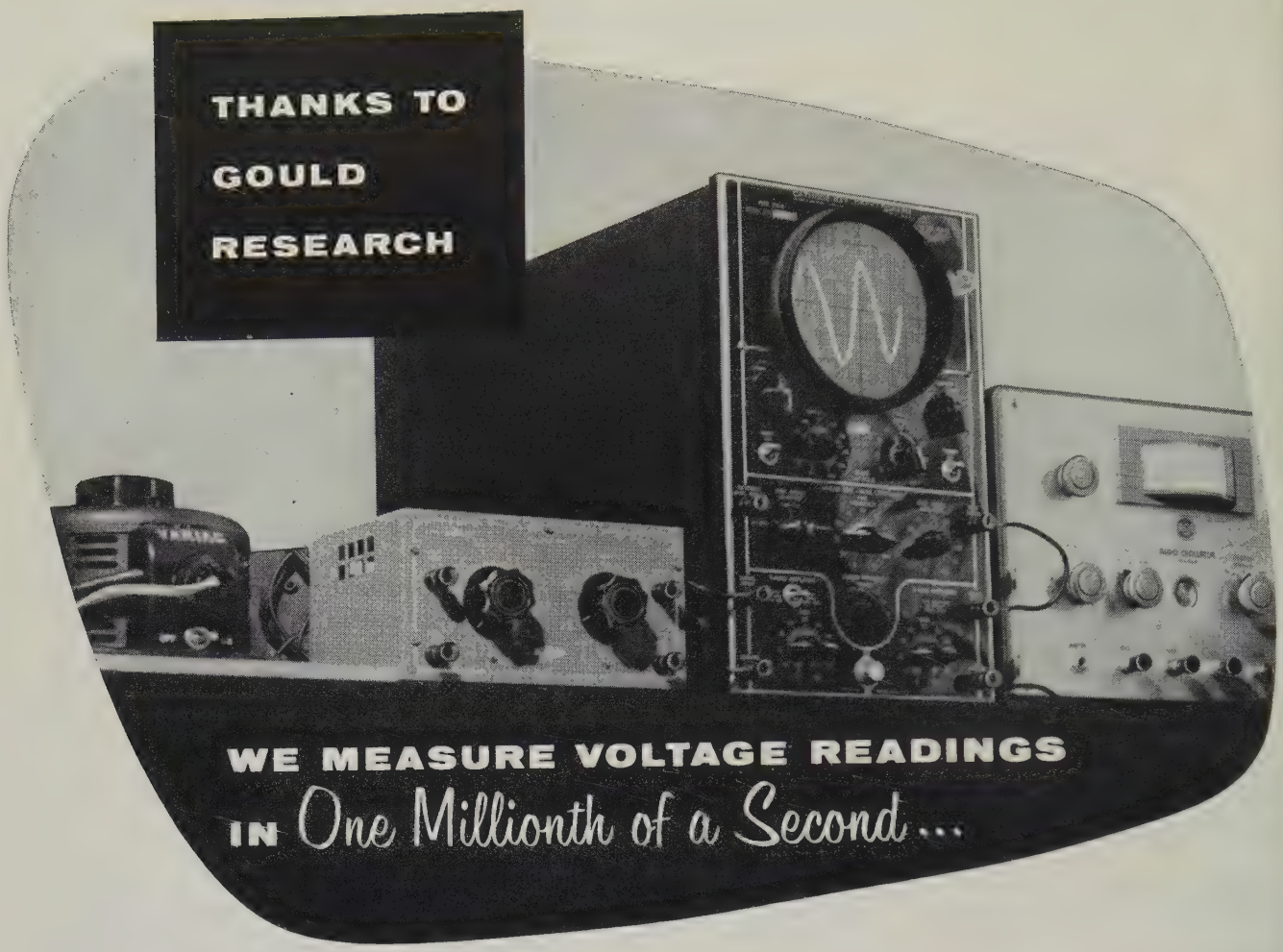
WALLS WITHOUT WELDS

UNITED STATES STEEL

ABOUT 34,000 TONS of 12¾" O.D. National Seamless Steel Pipe were used in this 475-mile oil products pipeline, from Duncan, Oklahoma to West Memphis, Arkansas. Its ability to resist great pressures and absorb distorting and bending stresses makes National Seamless ideal for pipelines.

49 MILES OF NATIONAL SEAMLESS TUBES make up this giant superheater. At thousand-degree temperatures, high-pressure steam lines *must* have the strength and uniformity to take constant punishment without failing. National Seamless has never been surpassed for safe, efficient power plant service.





TO GIVE YOU GREATER BATTERY DEPENDABILITY!

Practically instantaneous voltage readings are made possible by the Oscillograph shown above. This important laboratory instrument has enabled Gould research technicians to 1) carry on the study of battery performance under instantaneous loads of fast circuit-breaker operation; 2) study the response of a battery to high charge rates; 3) attain more closely a perfect balance between grid design and active material.

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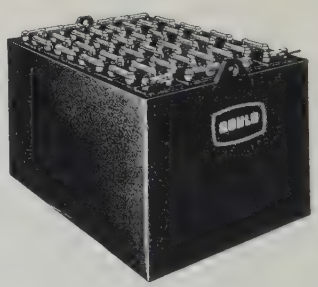
For the full story on Gould research, send for Booklet 749.



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Industrial Truck Batteries

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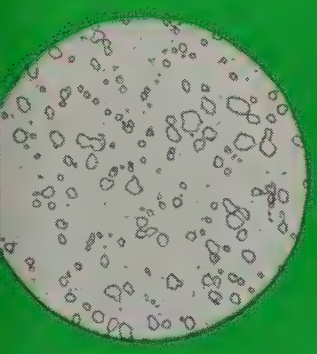

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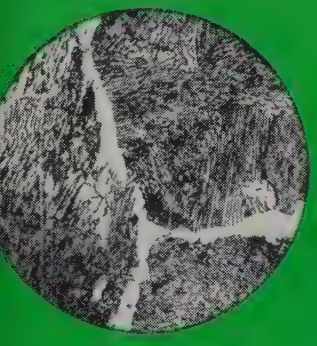
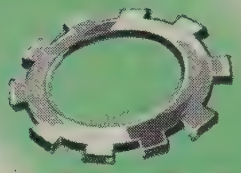
easier cold forming



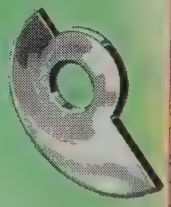
PEARLITIC . . .

or easier blanking procedure



WEIRTON

high carbon strip cold-rolled spring steel

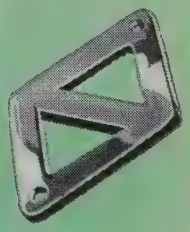


Manufacturers throughout the nation find Weirton cold-rolled spring steel consistently produces best results in a wide variety of products.

Weirton supplies spheroidized-annealed cold-rolled spring steel for operations where superior forming qualities are necessary. Simple and economical fabrication is assured by the exceptional ductility of the controlled grain structure.

Where clean, economical blanking is the major requirement, Weirton supplies pearlitic steel structure that is temper-rolled in controlled hardness and tensile strength.

Both structures are available for specific heat treating and hardness. And in both structures, Weirton high carbon cold-rolled spring steel possesses five highly important characteristics: 1. Uniform chemical and physical properties. 2. Exact consistency of grain structure. 3. Accurate response to heat treatment. 4. Exceptional uniformity of gauge and width. 5. Controlled decarburization limits. . . . Why not let Weirton help make your product better?



WEIRTON STEEL COMPANY

Weirton, West Virginia

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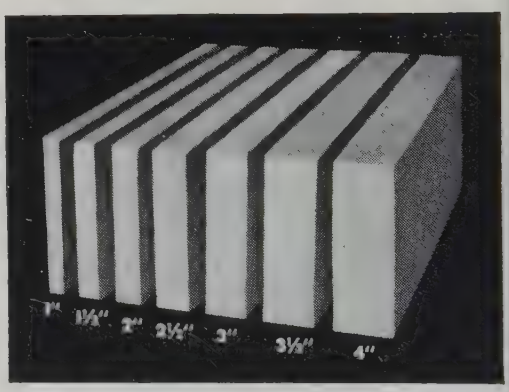
Specify J-M Superex, industry's favorite block insulation

Made from diatomaceous silica and asbestos for all temperatures to 1900F

YOU'LL ENJOY *greater insulation savings* with Superex®. Its unique combination of low conductivity and outstanding resistance to high temperatures provides greater operating efficiency and longer maintenance-free service. That's why Superex is the leading block insulation for furnace work.

Light and easy to work. Superex withstands temperatures to 1900F indefinitely with negligible loss of efficiency and is so strong that it compresses only ⅛ inch under 6 tons' pressure per square foot. Its light weight, excellent working properties and availability in large blocks mean quick, easy, low-cost installation.

For high temperature equipment. Since its introduction in 1927, Superex has received enthusiastic acceptance. Today it economically insulates 90% of the country's hot blast stoves. Other high temperature equipment where Superex has proved its superior performance include most types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, regenerators, kilns, roasters, high-temperature mains, flues and stacks.



Saves waste—Superex comes in 7 standard thicknesses from 1″ to 4″. Other sizes available on order.

For further information on Superex, write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.

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Sharon produces all popular grades of Stainless Steel in larg diameter coils for economical fabrication, and with the fines finish available in the industry.

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ALES OFFICES: Chicago, Cincinnati, Cleveland, Dayton, De- napolis, Los Angeles, Milwaukee, New York, Philadelphia, San Francisco, Seattle, Montreal, Que., Toronto, Ont.

Twenty ton mill type bucket crane with 75′ span built to A.I.S.E. #6 specifications, over the slag crushing plant in a large eastern steel mill.

20 Ton Bedford Mill Type Crane in slag crushing plant

The Bedford crane illustrated was designed for extra severe duty bucket mill type service — built strictly to A.I.S.E. #6 specifications. It uses a 3 cu. yd. capacity 4 line bucket. It is equipped with mill type 600 series motors, Tool Steel gears, pinions and wheels—forged steel flange type couplings are used throughout except all motor couplings are flexible type. The bridge is equipped with four two-wheel compensating trucks. The cab is equipped with safety glass on two sides, and each window is protected on the outside by sliding steel shutters to protect the operator from explosions in the pit. The cab floor is insulated to protect the operator from high temperatures in the pit.

The big swing to Bedford Cranes is evidenced by the high percentage of repeat orders from experienced crane users who require and *expect* superior performance.

Backed by more than half a century of *specialized* crane engineering and fabricating experience . . . Bedford Cranes have won fame the world over for advanced design and for safe, smooth, dependable performance.

Available in all types and sizes . . . from 5 tons to 350 tons . . . for all kinds of indoor and outdoor service . . . each Bedford Crane is individually engineered for its specific application.

Consult a Bedford engineer on your next crane problem . . . with all the facts on the table we believe you too will make your next crane a Bedford.

Write for complete catalog

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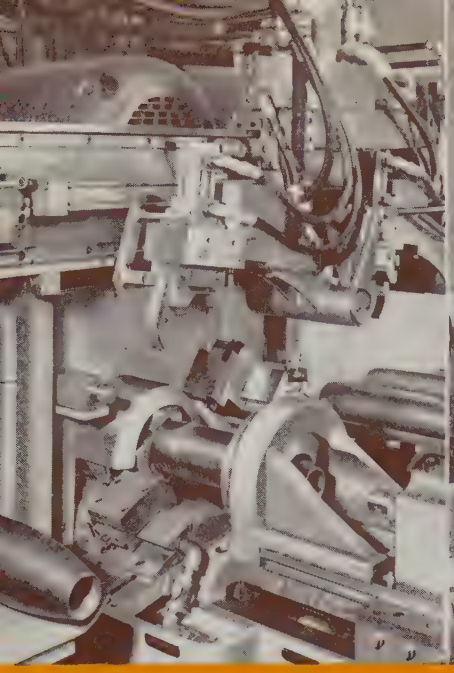
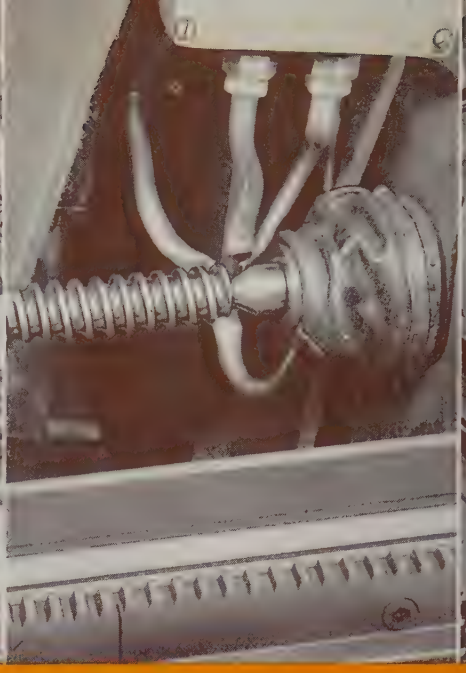
Modern machine tools that produce greater work accuracy at lower costs than ever before.
Scientific research in machining methods, metallurgy, tool geometry and inspection procedures.
Realistic Procurement — you have your choice of several sound financing methods, plus the advantages of new tax laws with more equitable write-offs.

From initial survey of your production requirements right through to delivery and installation of new equipment, every phase of J&L's Replacement Program service is complete, competent and reliable.

The man who needs a machine tool . . . is already paying for it.





AUTOMATIC HANDLING

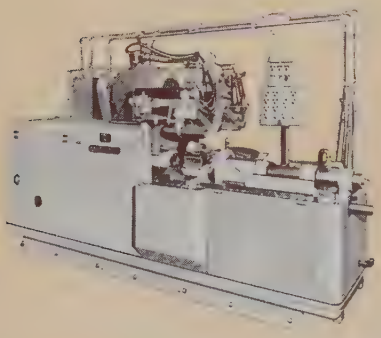
Completely automatic operation of this Fay Automatic lathe, including *loading*, *machining*, *chip and coolant disposal* and *unloading*, ups production to 180 pcs. per hour at 100% efficiency in the machining of these shells.

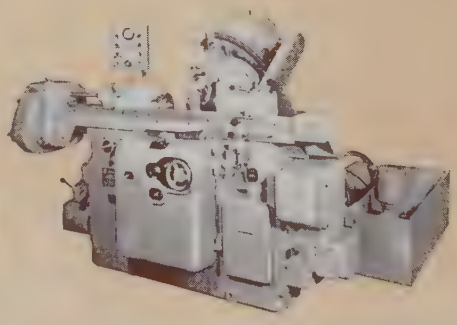
NEW METHODS

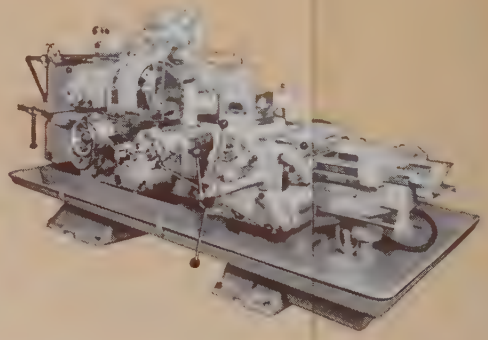
By grinding this worm (stock removal .1235" — one pass) on a J&L 6 x 36" Automatic Thread Grinder, production is increased 160% per machine over previous methods.

VERSATILE TOOLING

High production methods of tooling for automatic lathes were simplified and applied to three 7B J&L Universal Turret Lathes. Inner and outer Ball Bearing Races are produced on the same machines. Set up time from one lot to the next does not exceed fifteen to twenty minutes per machine.







Jones & Lamson's unique Procurement Plan offers you a choice of methods for procuring new, high-efficiency equipment. You may buy outright; pay-from-productivity on a variety of bases, at interest rates of 3¼% and lower (add-on); or you may use any of several variations of a truly flexible lease plan.

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Optical Comparators • Automatic Opening Threading Dies & Chasers
Automatic Double-End Milling & Centering Machines

Valuable information is yours for the asking. Simply fill in the coupon below, *clip it to your letterhead*, and mail.

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Please send me the Jones & Lamson Machine Tool Replacement Information Kit.

Name .....

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PUZZLED?

...about the problems of machine tool replacement?

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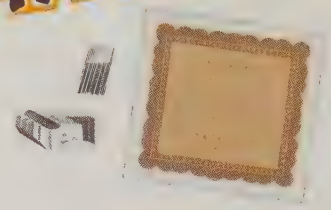
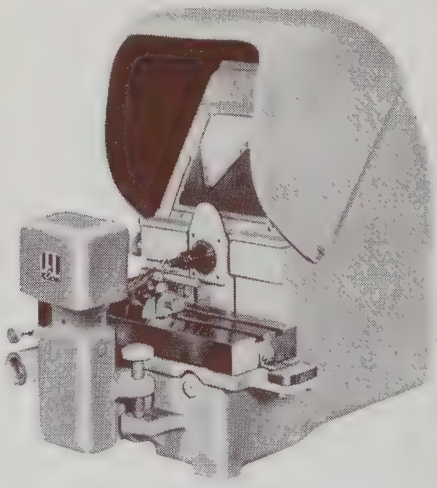


Every set of Jones & Lamson Die Head chasers carries this full guarantee: *to produce Class III threads, or better, across the board.* To insure this guarantee, and to keep manufacturing costs down, J&L carries on successive interoperation inspections the positive way, with Jones & Lamson Optical Comparators.

(We practice what we preach)

Avoid costly work on scrap—
Prove machining results before subsequent operations

Controlled quality means lower costs. Use J&L Comparators on *your* production line . . . their versatility is unlimited.



Write Dept. 710 for information on Comparators and/or Jones & Lamson Thread Tool Products.

HELPFUL

Dovetails of chasers are straddle milled. Tolerances checked on
The J&L OPTICAL COMPARATOR

Mill angle on front end of chaser. Length and angle checked on
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Dovetail angle milled. Angle and centerline checked on
The J&L OPTICAL COMPARATOR

Ratchets for spacing are milled. Chaser length, ratchet form and spacing checked on
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Back chamfer is milled. Angle and flat checked on
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After heat treating, dovetail is ground. Angles, flats and depth inspected on
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Grind thread form. Thread form, angles, root, crests, spacing, lead and helix checked on
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Chamfer ground as specified. Angle and amount below root checked on
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Top rake ground. End grind and point height checked on
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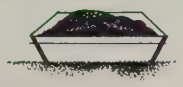
GIVES ADDED LIFE AND PROTECTION TO FIREBRICK JOINTS

'SAIRSET gives you one mortar for all types of service—industrial furnaces, boilers, ladles, flues and stacks, and rotary kilns. Its use is universal. It is recommended for laying high duty or super duty fire-clay brick, high alumina brick, or insulating firebrick. 'SAIRSET welds the brick into a one piece unit at temperatures too high for less refractory mortars—or at temperatures too low for heat-setting mortars to form a good ceramic bond.

Firebrick linings last longer when protected with 'SAIRSET. It insures full gastight joints . . . protects the firebrick lining against destructive spalling and shrinkage . . . reduces joint erosion due to chemical attack of slags or dust laden fumes . . . prevents penetration of joints by molten metal or fluid slag.

DOES NOT STIFFEN IN THE DRUM

The plastic consistency of 'SAIRSET makes it easy to remove from the drum. No time is lost and no mixing due to stiffening is necessary. Permits long storage and affords extra savings through the purchase of large quantities.



NO SETTLING

'SAIRSET does not settle out of suspension in the mortar box. Constant agitation is unnecessary to maintain the proper consistency.

EASY TO USE

'SAIRSET comes on the job ready mixed to troweling consistency—with all of its plasticity and other properties fully developed to bring you maximum efficiency and make using easier.

PACKAGED IN READY MIXED PLASTIC FORM

No long soaking period is required to develop the plasticity and smooth workability of 'SAIRSET. Special equipment is used to thoroughly mix 'SAIRSET before it is packaged in airtight containers. Available in 200 and 500 pound metal drums and 5, 15, 50 and 100 pound metal pails.

Your local A. P. Green distributor carries 'SAIRSET and other refractory products in stock. You'll find him listed in the yellow pages of your telephone directory, or write

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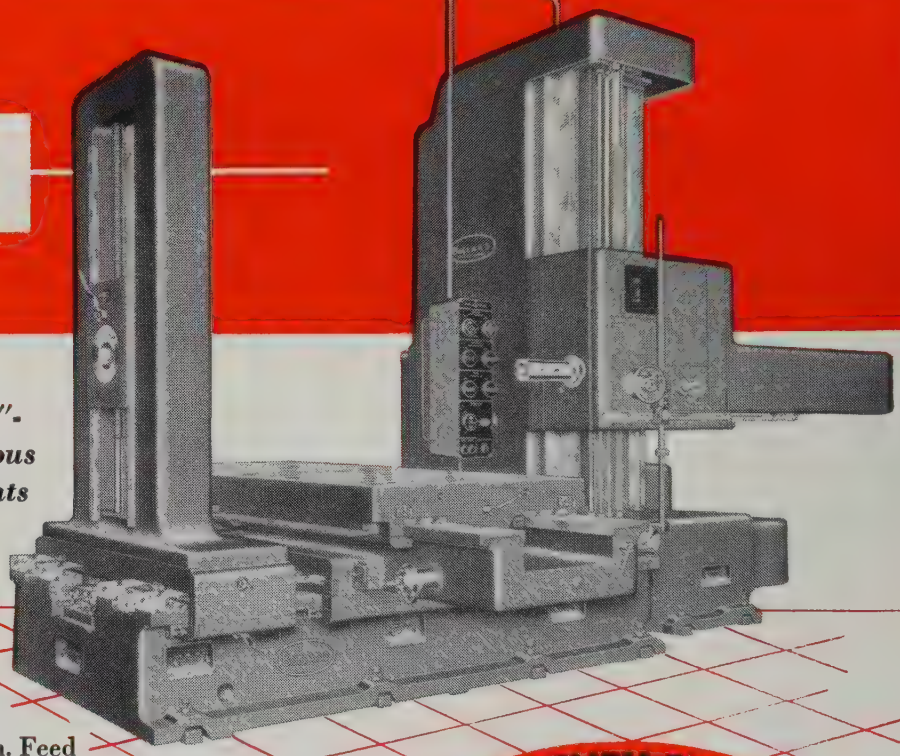
BULLARD HORIZONTAL BORING, MILLING and DRILLING MACHINES

MODEL 75



Available in 3"- 4"- 5"- spindle sizes with various bed lengths, post heights and table sizes.

PENDANT CONTROL – complete machine control from a movable pendant station. Feed and speed rate selection, directional feed and traverse engagement of the spindle, head, table and saddle, spindle rotation and operation of head binders are accomplished from the Pendant.

BOTH SCREW AND RACK FEED – to the spindle provide smooth, steady screw feed for boring and sensitive hand feed for small drilling and tapping.

SPEED RANGES – 9.5 to 2000 R.P.M. on 3" and 5.83 to 1200 R.P.M. on 4" and 5" sizes, meets any machining requirement.

RIGIDITY – is built into the massive 4-Way Bed, Head, Headpost and Rear Post assuring a higher degree of maintained accuracy.

OPTICAL MEASURING EQUIPMENT for head and table (optional)

AUTOMATIC POSITIONING – for head and table (optional)

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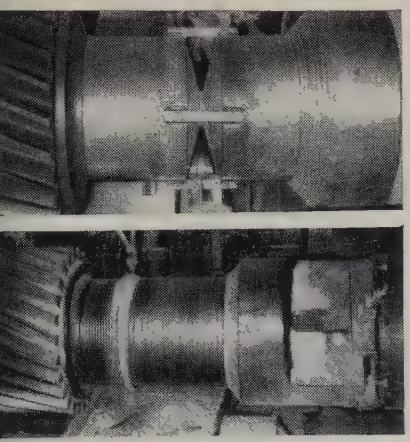
Linde TRADE-MARK METALWORKING NEWS

BROKEN 26-INCH PINION SHAFT BACK IN SERVICE THROUGH "UNIONMELT" WELDING

Maintenance engineers at a large Canadian steel mill took a second look at their cost figures when a 26-inch mill pinion shaft snapped because of metal fatigue. Usually, a broken shaft of this size is valued only as so many pounds of scrap steel and the purchase of a replacement part is required at considerable expense. Spurred on by the possibility of large savings, the engineers decided to fabricate a new section and UNIONMELT weld it to the undamaged



(Top) The two sections of the shaft are assembled on a 4-in. plug and held rigidly by temporary tie-bars. (Below) The welding is completed by making a surfacing weld over the entire length.

end. First, the new section and the broken end of the pinion shaft were machined back to form a beveled joint. A 4-in. hole was then cut in the centers of both sections and a plug inserted for alignment purposes. Reinforcement bars were tack-welded across the joint to maintain alignment while the parts were placed in a rotating positioner. The reinforcement bars were then cut off and the joint was preheated to 700 degrees Fahrenheit with oxy-acetylene flame-heating heads. A UNIONMELT DS welding head was used to deposit over 275 lb. of weld metal in the vee making a sound, porosity-free joint. The welding was completed by making a surfacing weld over the entire weld area. The shaft was then machined and put back into operation at a fraction of the cost of a new part.

Call your nearest LINDE Office today and find out how you can cut costs and save time in your plant maintenance operations with UNIONMELT welding.

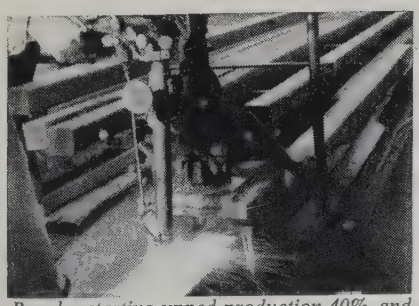
Shot holes are made with a powder-lance in ¼ the time needed by previous methods.

SLAG POCKET SHOT HOLES PRODUCED IN ¼ THE TIME WITH POWDER-LANCING

Before an open hearth furnace can be rebuilt the slag pocket contents and brickwork have to be blasted loose. This practice requires the making of shot holes in which the charges are placed. In the past these shot holes were produced by drilling with wagon drills, hand operated pneumatic drills, or sometimes by using hollow refractory sections . . . all costly and time consuming methods. LINDE engineers recommended powder-lancing using a mixture of aluminum and iron powder to create the extremely hot exothermic reaction needed to pierce the firebrick, slag, and hard inclusions. Producing six shot holes in a 250-ton capacity furnace by mechanical means requires up to 24 hours of drilling. With powder-lancing the job can be completed in 6 hours—only ¼ the time. The holes can be lanced at any time during the furnace production cycle because the powder-lanced holes retain their shape and size for weeks.

Call your nearest LINDE office today and find out how powder-lancing can be used to cut your open hearth furnace production and maintenance costs.

POWDER STARTING BOOSTS PRODUCTION, LOWERS COST



Powder-starting upped production 40% and cut costs 30% in this billet cut-off operation.

A southern manufacturer of steel products reports a production increase of 40 per cent and a reduction in total unit cost of 30 per cent with the introduction of powder-starting in an oxy-acetylene cut-off operation. It was estimated that a standard cutting blowpipe required a minimum of 18 seconds to start cuts in 6-in. steel gothic squares. Powder-starting was added by attaching a powder-cutting adapter to the standard oxy-acetylene cutting blowpipe. Now, cuts are started in 1½ to 3 seconds.

In powder-cutting an iron-rich powder is added to the oxygen stream to develop an extremely hot cutting flame. The powder-cutting process makes the cutting of stainless steels, cast iron, or non-ferrous metals an efficient, economical operation.

Ask your nearest LINDE representative how you can increase production and lower costs with powder-starting and other powder-cutting processes.

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 E. 42nd St. UCC New York 17, N. Y.
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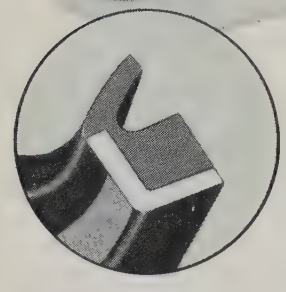
KLOZURE* OIL SEALS

USED IN THE FIRST SEALED FULL TYPE ROLLER BEARING

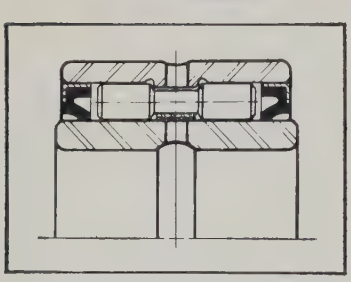


Above: McGill's new sealed Guiderol** bearing with two *built-in* springless KLOZURES, Model 71-A. *Left:* The Model 71-A has a narrow cross section consisting of a molded synthetic rubber sealing member securely bonded to and integral with a metal case.

In developing their new sealed Guiderol bearing, the designers of McGill Manufacturing Co., Inc., (Valparaiso, Ind.) required a dependable grease seal which could be built into the unit *without* increasing the overall bearing size.

Springless KLOZURE Model 71-A proved to be the answer! For here was a proven grease seal of narrow cross section specifically designed for limited space applications. Here, also, was a trouble-free seal which would keep out dust and retain the lubricant for the *life of the bearing.*

There's a service tested KLOZURE model for every bearing application. Let us show you how Garlock KLOZURES can solve your sealing problems. Just call the Garlock office nearest you or write for KLOZURE Catalog 10.



Two springless KLOZURES, lips turned in, on Guiderol bearing provide lifetime retention of lubricant. For relubricating at high pressures other sealing arrangements (with lips turned out; with one lip in and one out; and single seals) are available with these bearings.

*Registered Trademark

**Trademark of the McGill Manufacturing Co., Inc.

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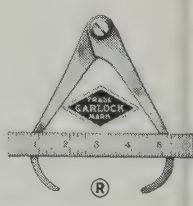
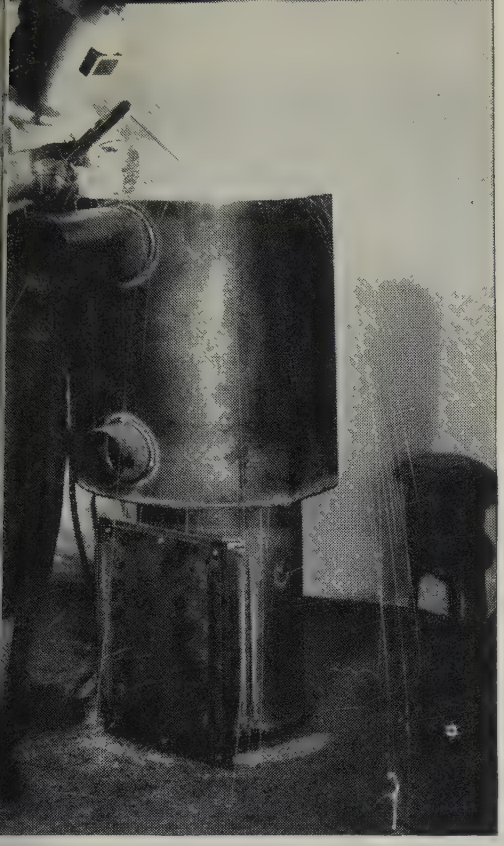
Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo • Chicago Cincinnati • Cleveland • Denver • Detroit • Houston • Los Angeles • New Orleans • New York City • Palmyra (N.Y.) • Philadelphia • Pittsburgh • Portland (Oregon) • Salt Lake City • San Francisco • St. Louis • Seattle • Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.



GARLOCK

PACKINGS, GASKETS, OIL SEALS, MECHANICAL SEALS, RUBBER EXPANSION JOINTS



In this heat exchanger for gas furnaces

Switch to USS COR-TEN Steel extends service life 2 to 3 times

The superior resistance to atmospheric corrosion provided by USS COR-TEN Steel pays off in several ways for the Hall-Neal Furnace Company, Indianapolis, Ind.

This company makes the Victorgas unit, a heat exchanger for domestic gas furnaces. When built of plain carbon steel these units were quite vulnerable to corrosion, and service life was not as long as desired. Corrosion was encountered when furnaces were down during the summer months. Damage due to condensation of water vapor and the products of gas combustion was particularly severe in intermittent service.

By changing to USS COR-TEN Steel, which has 4 to 6 times the atmospheric corrosion resistance of carbon steel, it was possible to extend the service life of these units 2 to 3 times. This achievement not only pleases the furnace makers but makes for greater customer acceptance and helps to boost furnace sales.

USS COR-TEN Steel's ability to form and weld readily, and to safely withstand furnace temperatures up to 1000° F. are other advantages which, added to superior corrosion resistance, far offset its slightly higher cost.

USS MAN-TEN Steel used in portable scaffolds reduces weight 19%,

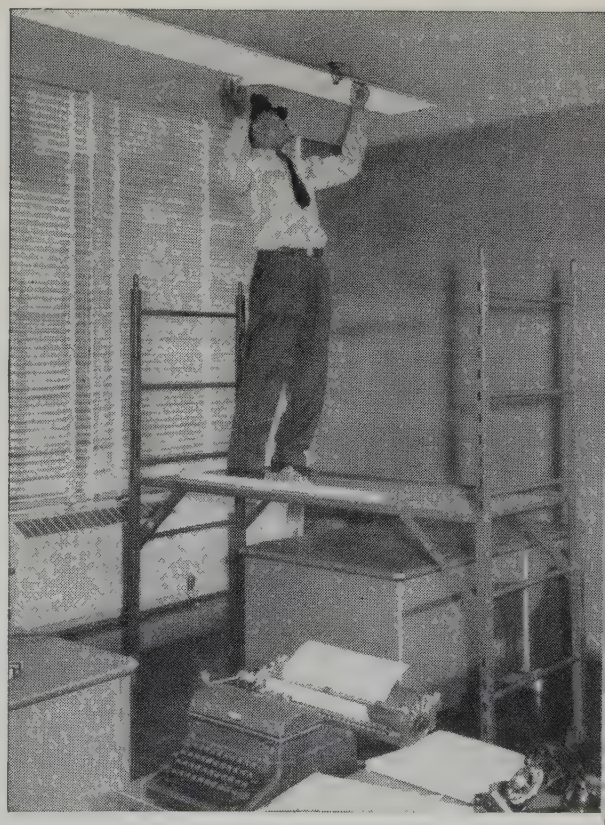
provides greater strength and durability

These portable work scaffolds manufactured by Baker-Roos, Inc., Indianapolis, Ind., are adjusted and moved more easily, and are more rugged and durable because side rails were redesigned to incorporate USS MAN-TEN Steel.

Used by builders, painters, electricians, carpenters and maintenance men in all types of off-the-floor work, the "no X-brace" construction of Baker-Roos scaffolds allows them to span furniture and equipment so that regular production will not be interrupted in occupied areas.

This type of construction and function requires a combination of strength and light weight for maneuverability. To improve the scaffold in these respects, the side rails were changed from carbon steel angles, 1½" x 1½" x 3/16", to a section formed from MAN-TEN Steel hot rolled strip, .0747" x 5½".

This has reduced side rail weight 19% making it easier to shift the scaffold from job to job. And even though USS MAN-TEN steel is used in lighter sections, the fact that this steel is one and half times stronger than carbon steel and has 40% higher fatigue strength ensures a stronger and more durable side rail than before.



NOW AVAILABLE . . . Our new "Design Manual for High Strength Steels" is ready for distribution. This excellent book contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the sound use of high strength steels. For your free copy, write on your company letterhead, giving your title or department, to United States Steel Corporation, Room 4721, 525 William Penn Place, Pittsburgh 30, Pa.

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NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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USS HIGH STRENGTH STEELS

USS MAN-TEN • USS COR-TEN • USS TRI-TEN

ULBRICH Stainless Steels

Certified ANALYSIS can be given on any Ulbrich material.

COMPLETELY EQUIPPED CONVERTING WAREHOUSE

STRIP • Flat Wire and other Stainless Steels
Converted to your closest requirements and
exactly as you want it!
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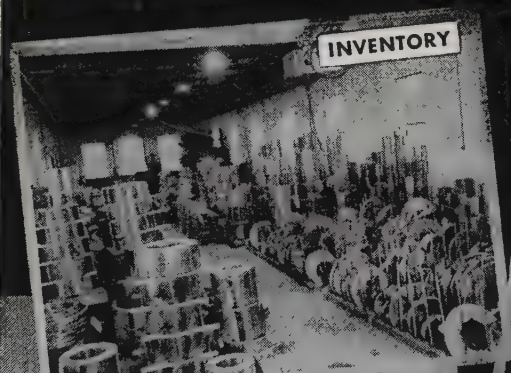

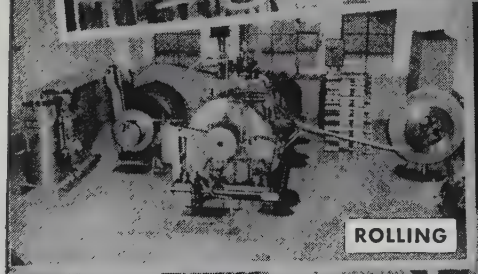

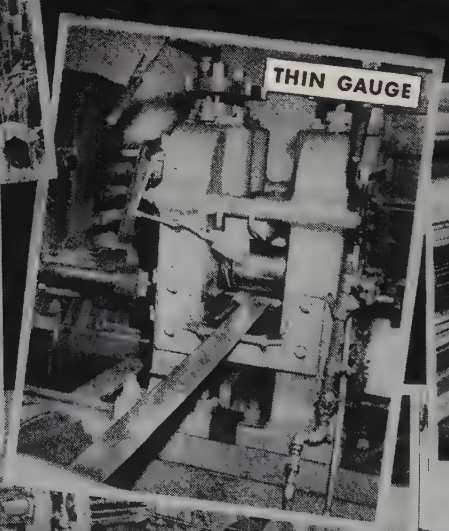

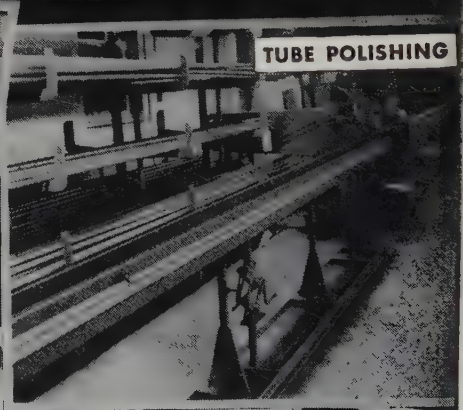

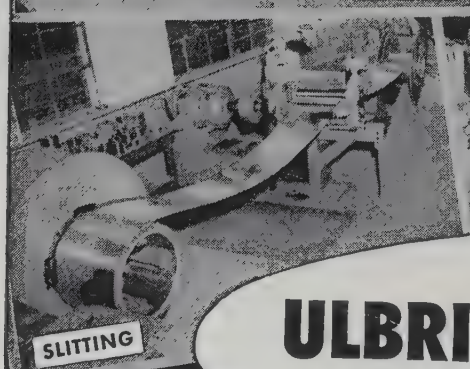

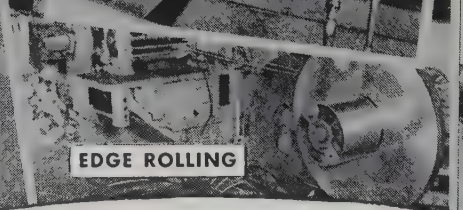

ULBRICH Stainless Steels

WALLINGFORD, CONN.
Phone: Wallingford 9-7771

HOW TO RATE A CUTTING OIL

FOR HIGH PRODUCTION ON TOUGH JOBS

There has never before been a cutting oil selection chart such as Atlantic now offers. It rates oils on job efficiency, not just chemical composition.

This cutting oil chart uses 3 variables to give you the "Cutting Units" which can then be used to select the proper Atlantic Cutting Oil for the job.

Here's what the chart does for you . . .

1 *Provides a* **CUTTING INDEX**—*or rate of metal removal*

2 *Lists* **TOOL MATERIAL**—*by type and composition*

3 *Relates* **METAL** *machinability to both Cutting Index and Tool Material*

4 *Selects proper* **OIL**—*by cross reference of Cutting Units it names the Atlantic Cutting Oil to use*

With Atlantic Cutting Oils, you can maintain high production rates on hot, tough jobs—and without foul odors. Work is visible right through the oil. The oils are compatible when blended—even down to the heaviest grades. Operators like these oils, too, because they don't indelibly stain hands or clothing.

Get complete information on these new oils and your copy of the Atlantic Cutting Oil Selection Chart. Write, wire or phone the nearest Atlantic office. The Atlantic Refining Co., Dept. S-5, 260 South Broad St., Philadelphia 1, Pa.

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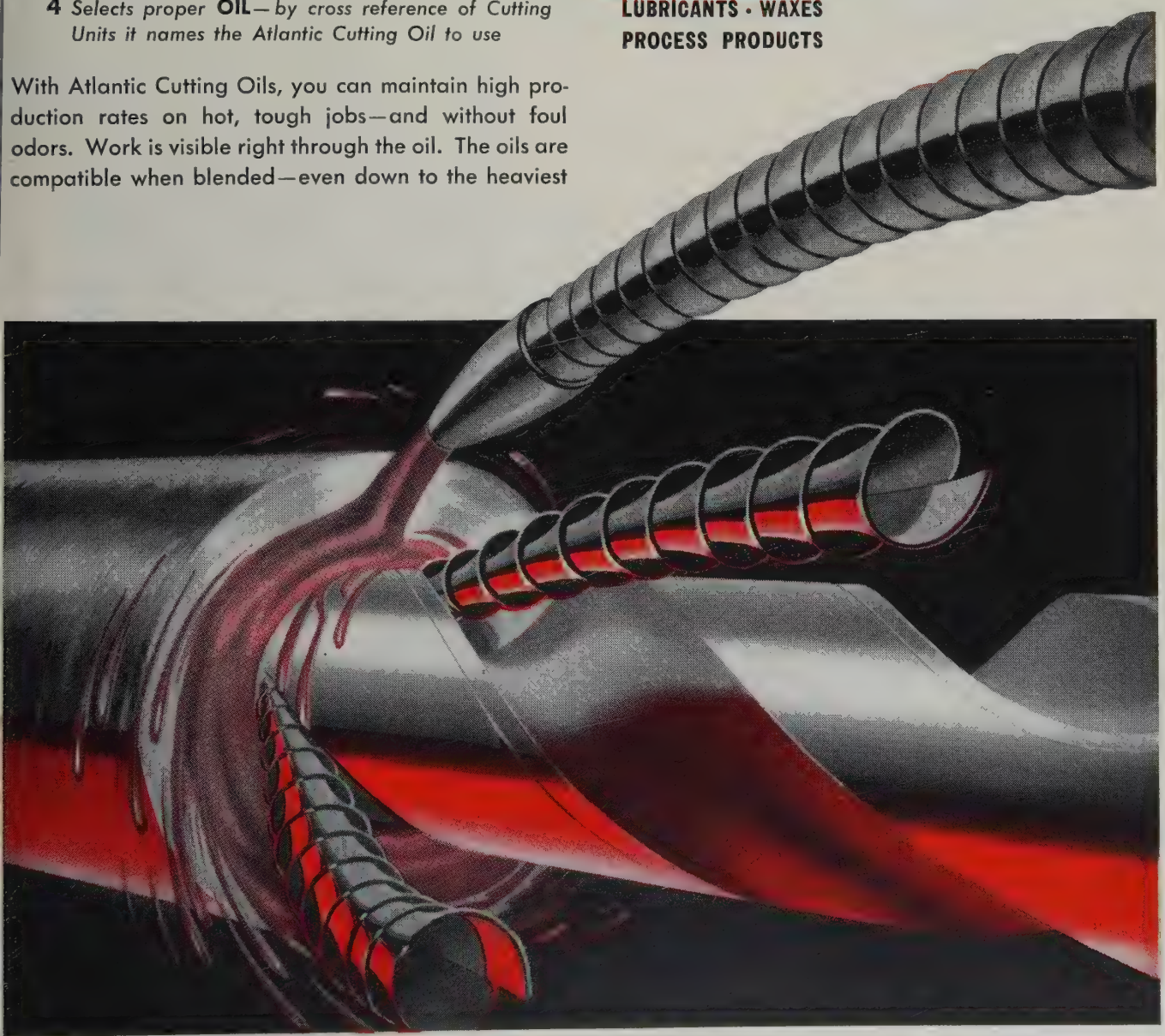
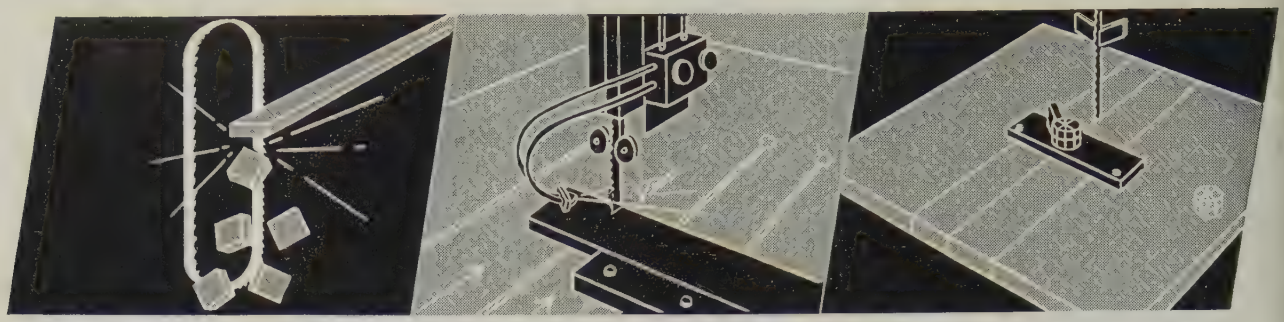


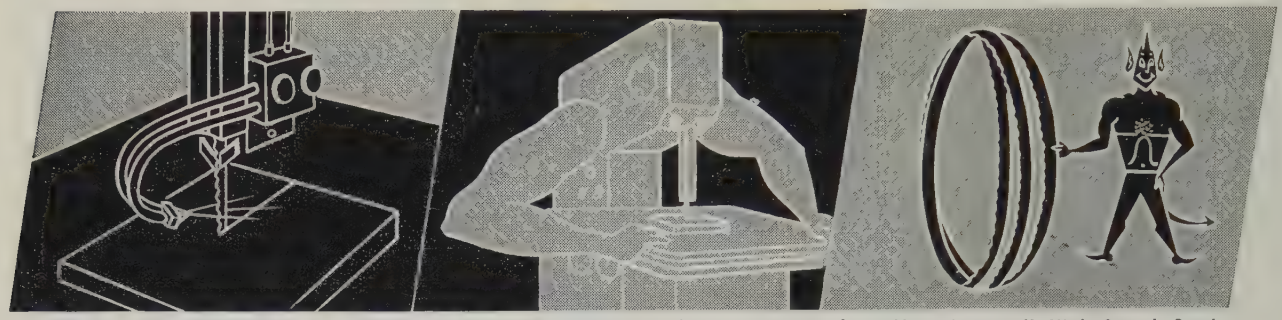
Formula for Production Cost Reduction . . .



+ 1. *The Speed of Band Machining* — continuous cutting action of 1000 to 1500 teeth.

+ 2. *Hydraulic Power Feed Table* — automatically carries the work into the continuous cutting blade.

+ 3. *Simple Clamps or Fixtures* — just to hold the work in position on the hydraulic feed table.



+ 4. *Integral Recirculating Coolant System and Air Jet*—for faster cutting and excellent finish.

+ 5. *Massive Rigidity and Extra Power* — for extreme accuracy and high continuous output.

+ 6. *New "Demon" High Speed Steel Blades* — up to 6 times faster cutting and 10 times the tool life.

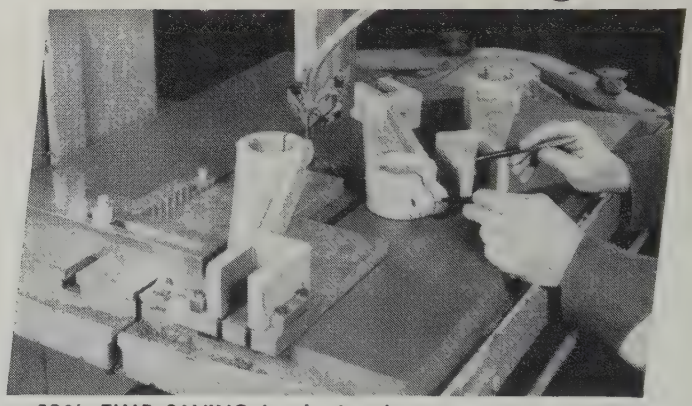
. . . Mass Production Band Machining!

MANY production line machining operations such as slotting, splitting, notching, cutting to shape now being done on milling machines, shapers, planers, lathes can be done at ⅓ to ½ the cost with DoALL production band machining. The formula above shows you why.

With band machining, cutting is faster, tool cost is lower, fixturing costs less, capital investment is less. Greater versatility is provided by the "non-restricted geometry" of band machining—cut any angle, any direction, any radius.

This new concept of machining has been made possible by new DoALL Contourmatic band machines, and new "Demon" *high speed steel* blades.

You have to see it to appreciate it. Ask a DoALL man to show where you can apply it.



53% TIME SAVING in slotting bronze castings with band machining—formerly done with a slitting saw on a milling machine.

FREE DEMONSTRATION. You can see it and believe it! Call your local DoALL Store (see classified directory) or write **The DoALL Company**, Des Plaines, Illinois, for a free demonstration. And, ask for new Catalog.

PB-12

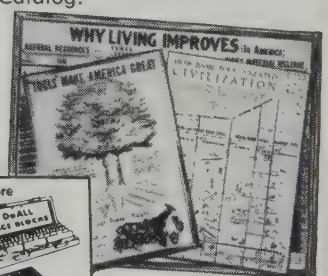
DoALL

NEW COLOR FILM—"Production Band Machining" now available showing operation of this new machining concept.

Friendly DoALL Stores . . . (in 40 cities)

Personalized Service . . . Complete Stocks . . . Local Delivery

Call Your DoALL Service-Store
DoALL SAW BANDS
DoALL CAGE BLOCKS
DoALL GRANITE PLATES
Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock
The DoALL Company, Des Plaines, Ill.



EDUCATIONAL STUDY WALL CHARTS

Economic Principles

$1.00 each postpaid

Lower quantity prices.

Use "EM" Ferro-Alloy Briquets for convenient charge make-up and easy handling

CHECK THESE ADVANTAGES

You have a choice of 5 kinds of "EM" briquets—Silicon, Silicomanganese, Ferromanganese, Chromium, and Zirconium.

You have a choice of 3 kinds of shipments to suit your convenience—bulk, packed on pallets, or packed in 250-lb. bags.

Pallets are designed for fast, easy, and safe handling by lift-truck or overhead crane. Pallet shipments reduce your handling costs.

"EM" briquets are easy to handle in the foundry and convenient to use in the cupola charge. No weighing is necessary —just count the number of briquets to obtain the weight needed for the charge.

"EM" briquets are scientifically designed for maximum alloy recovery in cupola melting.

For additional information write or phone the ELECTROMET *office nearest you.*

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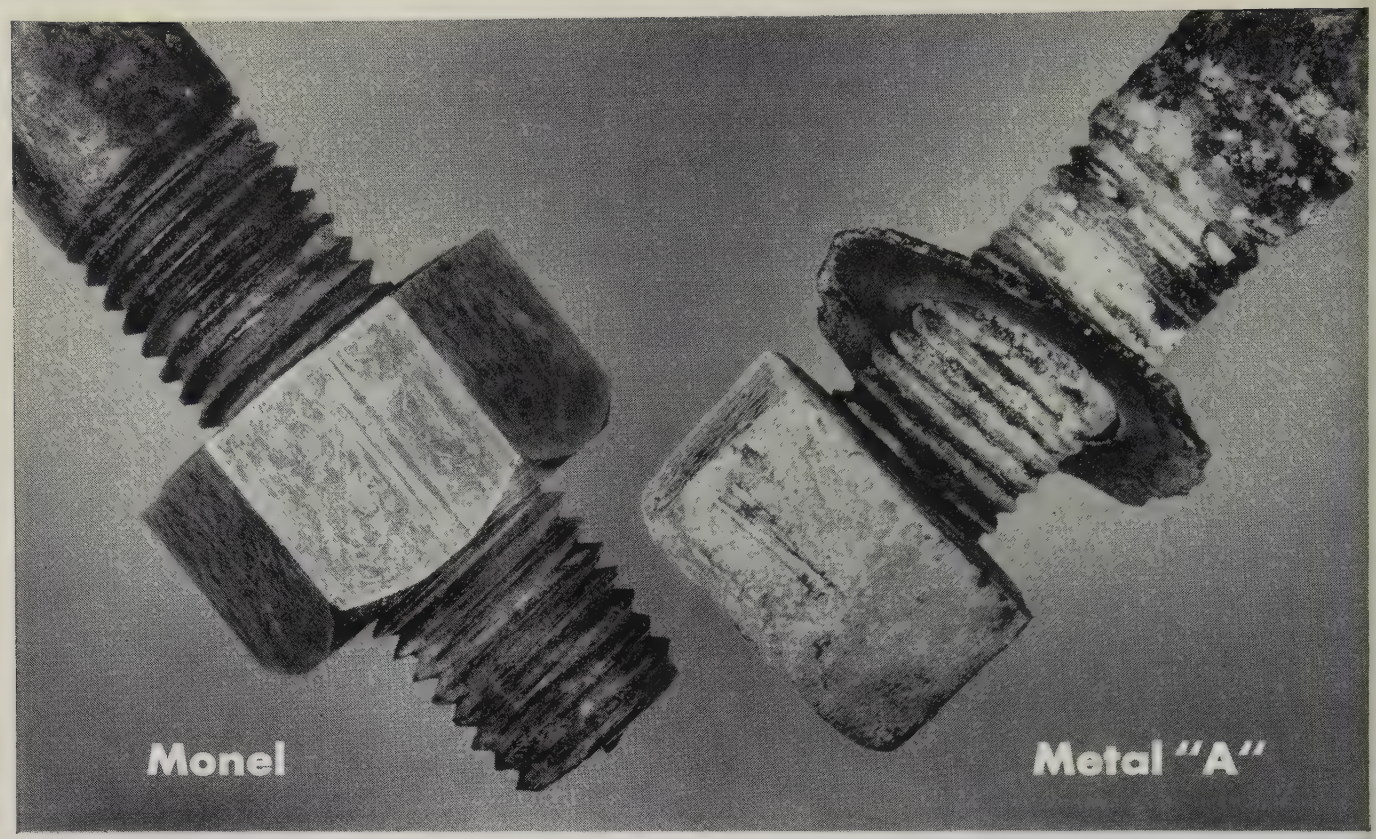


Compare these "take-up" threads...

You can tighten Monel pickling tank tie rods years longer

Look at the evidence . . . evidence you can duplicate.

The threads tell the story of Monel tie-rods' corrosion resistance. Monel does not dezincify and so the threads in front of the nut are as good as they look . . . all sound metal.

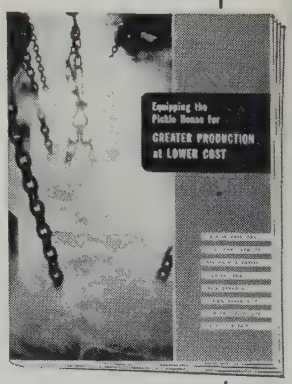
So when you need take-up thread, you have it, with Monel. You have it for many years.

Monel tie rods, users say, ordinarily outlast both the original wood tank and at least one replacement. One steel mill superintendent, for example, reports, "Monel tie rods gave us 19 years service on two old tanks . . . 22 years on two others." (The acid is 6-10% sulfuric at 180°F.)

Tight tanks save acid — Many users state that acid saving alone repays the first cost of Monel tie rods. They tell of other things they like, too . . . *Monel strength,* under tensions applied in tightening and by swelling timbers, *Monel toughness,* these rods take the wear and tear of pickling service in their stride.

New booklet packed with equipment suggestions

See and read about many recent developments in Monel equipment for the pickle house. A spanking new 32-page Inco booklet, "Equipping the Pickle House for Greater Production at Lower Cost" gives illustrations and performance information. Tells how *you* can take advantage of Monel in designing your equipment. Write today.



THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **Monel** . . . for pickling equipment

Metalworking Outlook

Counterproposals from Ford

Ford Motor Co.'s counterproposals on the new labor contract include: More safeguards in the area of management security; complete management discretion in promotions; exclusion of timekeepers, drivers and certain clerical and production control workers from union membership; elimination of full-time union representatives. Brass-tack bargaining has started in both Ford and General Motors Corp. parleys. GM wants another five-year contract. Under the current one, it emphasizes, hourly workers received total increases of 44 cents, plus higher fringes.

Automation: Union Battle Cry

Why a guaranteed annual wage? Automation makes it necessary, says the United Auto Workers. Why the need for higher wages? Automation justifies them, says the UAW. Why should a union move into some managerial areas? Automation again, says the UAW. Look for Walter Reuther to make that an even stronger theme as 1955 negotiations get hotter. A warm up was the CIO's Conference on Automation in Washington late in April.

$68 Billion Capital Spending?

Capital goods spending will near an annual rate of $68 billion within the next 25 years. So predicts Sydney D. Maddock, president of C.I.T. Corp., an industrial financing firm. He sees outlays hitting $27 billion this year. Reasons for the gains a quarter-century from now: Rising labor costs, keener competition and natural growth of the economy.

Aircraft Prospects

The Air Force expects to place orders for 2333 new aircraft in fiscal 1956. That compares with 1462 scheduled to be placed on order during this fiscal year and 1431 planes ordered in fiscal 1954. The Navy plans to order 1613 new aircraft in fiscal 1956 at an average unit cost of $945,000, compared with $1,139,000 this year.

Answering Critics

The Defense department wants contractors with more than $1 million in annual governmental business to set up a "defense subcontracting small business program" on their premises. Contracts over $5000 will contain a clause "requiring" subcontracting to small firms where possible. That move, of course, is aimed at silencing legislators' criticism of declining participation in defense work by smaller companies.

The Paying Jobs

You earn more as a factory manager or superintendent than you would as a regional or district sales manager. That's what the American Man-

agement Association learns in a survey of middle management compensation. Preliminary figures indicate that average annual compensation of regional or district sales managers is $12,000, compared with $14,000 for factory managers or superintendents. The average age of men in those positions is 45; average length of service in their present jobs is four years.

Coming: More Ingot Capacity

National Steel Corp. Chairman Ernest T. Weir says we need more steel capacity. He points out that, at the present rate of population growth, we'll require 75 million more tons of ingot potential by the year 2000 to keep pace. To build that, steelmakers would have to spend $500 million a year for the next 45 years. The present cost of steel plant construction is about $300 per ingot ton.

Antitrust Talk

Rep. Emanuel Celler (Dem., N. Y.) plans: The three-week hearings of his Antimonopoly Subcommittee, starting May 10, will be only a preliminary survey of antitrust problems. Hearings, he says, will determine the "amount of further intensive examination" needed. Mergers and concentration, patents, distribution, price discrimination, fair trade, foreign cartels and export associations are on the preliminary agenda. The Senate Small Business Committee started antitrust hearings Apr. 27.

Straws in the Wind

Bills to extend the manganese purchase program for five years (to June 30, 1963) and to increase the amounts to be purchased are opposed by the Interior department . . . A bill calling for a uniform, 5-per-cent excise tax on all end products of manufacture, except food and drugs, is introduced by Rep. Noah Mason (Rep., Ill.) . . . House Interstate Commerce Committee Chairman Percy Priest (Dem., Tenn.) believes congressional action is unlikely this session on the report of the Cabinet Committee on Transportation . . . There will be 166 exhibitors at the machine tool show and 160 at the concurrent production engineering show at Chicago next September . . . Thus far in 1955, a 7-to-10-cent pay-increase pattern is emerging.

This Week in Metalworking

Lengthening deliveries on steel, copper and aluminum will delay inventory build-ups (Page 63) . . . Machine tool business is picking up (Page 64) . . . First quarter metalworking earnings presage a banner profit year in 1955 (Page 66) . . . Take a look at the new picture in industrial photography (Page 67) . . . Here's a checklist to help you in lowering freight costs (Page 69) . . . Rising nickel requirements for military and Atomic Energy Commission equipment has Washington planners puzzled (Page 70).

NEW Aluminum-coated Steel for rugged outdoor service

Armco ALUMINIZED STEEL (Type 2), made by coating sheet steel on both sides with molten aluminum, is your best bet for products used in outdoor service. Tests over a period of 15 years show that the atmospheric corrosion resistance of the new aluminum coating is at least 3 times that of the coating on commercial galvanized sheets.

This new product combines the great strength of steel with the corrosion resisting properties of aluminum. Yet, on the basis of equal thickness it costs less per square foot than solid aluminum. Besides that . . .

- *It can be formed without flaking of the coating*
- *It reflects more than three-fourths of the radiant heat thrown against it*
- *It resists fire damage far better than metals with low melting points*

For complete information on this new aluminum-coated steel, just fill out the coupon and mail it to us.

ARMCO STEEL CORPORATION
1235 Curtis Street, Middletown, Ohio

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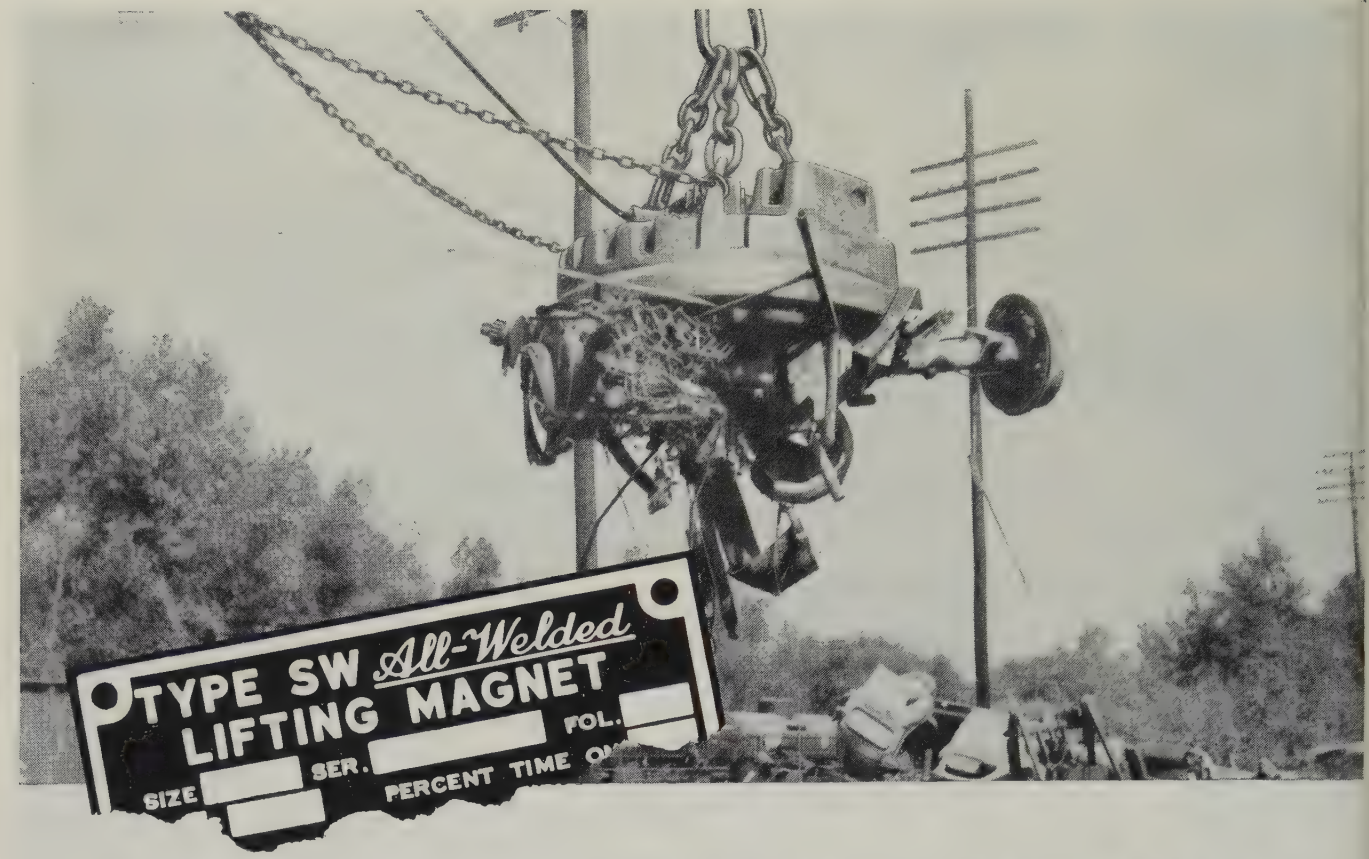
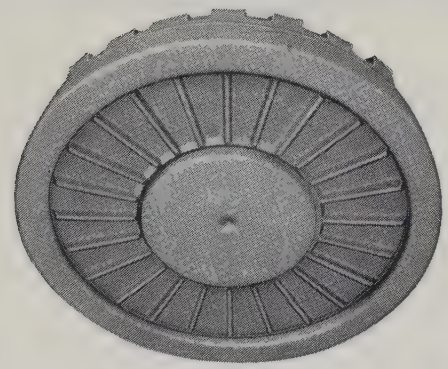
ARMCO STEEL CORPORATION 1235 CURTIS ST., MIDDLETOWN, OHIO

SPECIAL STEELS

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • ARMCO INTERNATIONAL CORPORATION



More Features of EC&M TYPE SW ALL-WELDED LIFTING MAGNETS Assure More Dollar Value



EC&M Type SW ALL-WELDED Lifting Magnets have a new look . . . inside as well as outside. Stronger, better designed to withstand the hard knocks encountered in magnet operation, they are easier to maneuver, and through high lifting capacity they reduce handling costs.

The magnet-coil is wound between turns with purer, thinner asbestos tape, with its strength increased by impregnation with EC&M No. 281 compound. Between layers, the insulation is a new product—ECAMICA board which is moisture-free, has high dielectric strength and excellent mechanical ability. A new fabricating process locks the windings against movement.

Look at the features pictured here in the top and bottom views of the magnet. Remember, too, that these EC&M magnets are ALL-WELDED to keep pole shoes tight—to keep moisture out—to increase the efficiency of the magnetic circuit and to prolong magnet life.

write for bulletin 900

1762

THE ELECTRIC CONTROLLER & MFG. CO.

4498 LEE ROAD ★ CLEVELAND 28, OHIO

Time for Optimism

Late in 1954, STEEL's editors asked several thousand metalworking executives to make an economic forecast for 1955. The 10 per cent increase in business they predicted seemed overly optimistic at the time.

Now, however, that figure appears to be conservative. Here is the evidence:

Gross national product is likely to establish a new, all-time record of $370 billion. Significantly, this is occurring because of private, not government, spending.

Construction already is beating last year's records. The total for the year is expected to be $40 billion, up $3 billion from 1954. New housing starts are headed for 1.2 to 1.3 million units, the highest level since 1950.

Investments in new plant and equipment again are climbing. Machine tool sales, highest in 19 months, will be given another shot in the arm by the national show this fall.

This year may be the auto industry's best. Low dealer stocks indicate sales are in step with accelerated output. Earlier predictions that 1955 model production would be completed in five months missed their mark. The feeling persists that there will be no strike.

Steel ingot production last week was at the near-record annual rate of 120.4 million tons. For the year, production of at least 105 million tons is a distinct possibility.

Purchasing agents are tending to extend coverage on materials, yet maintain they are not indulging in speculative buying.

First-half, metalworking sales are at the record annual rate of $126 billion, up $14 billion from 1954. Even allowing for a third-quarter dip, 1955 has an excellent chance of equaling or exceeding 1953's record of $125 billion.

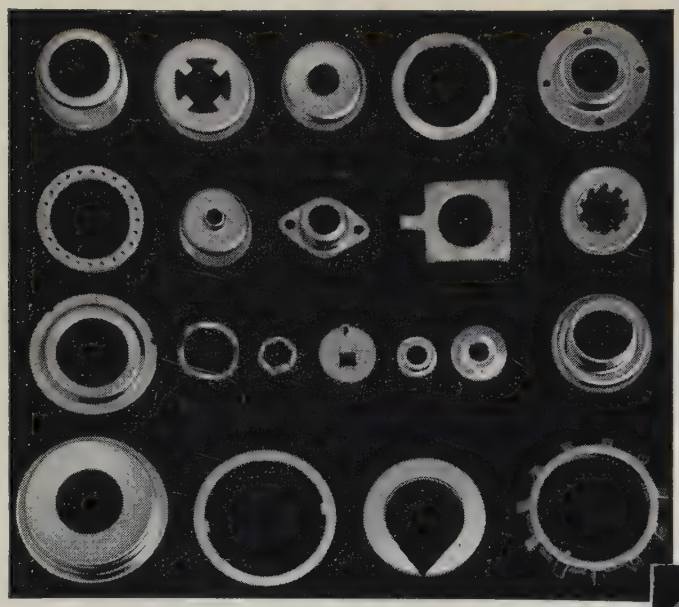
It is easy to ascribe plenty of blue-sky thinking to this array of optimistic statistics. But don't forget two fundamental facts: 1. That intangible, psychological thing called confidence prevails. 2. Far more goods and services are needed each year just to maintain present standards of living without considering the pressure for still higher standards. By 1960, 15 million more people will be added to our present population of 165 million.

It's no time for pessimism. It's the time for forward thinking and planning!

Irwin H. Such
EDITOR

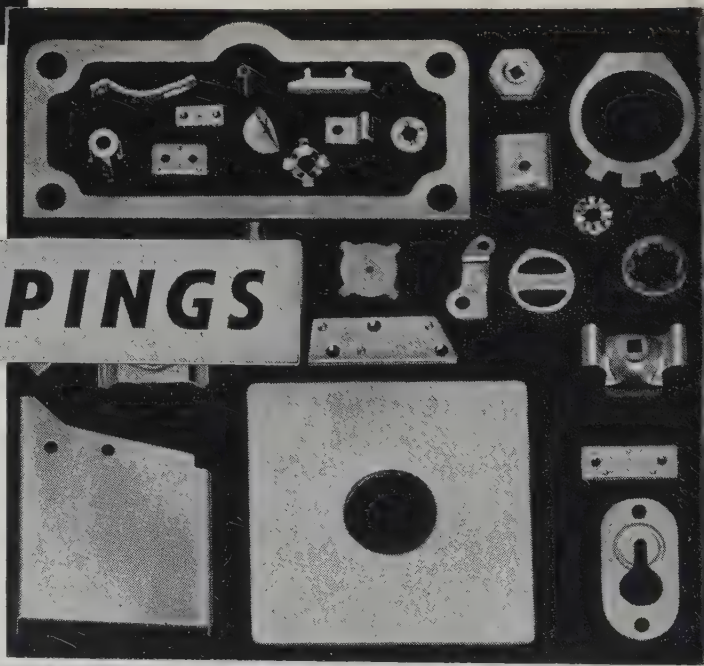
LEADERSHIP *Backed by*
68 Years of Continuous Service to American Industry

MILWAUKEE
WROT WASHERS



SINCE 1887

In terms of "satisfaction to the customer" the dominant leadership of Wrought Washer Mfg. Company in this specialized field represents not only a thoroughly dependable source of supply to meet all your requirements for Standard and Special Washers, but of equal importance, it carries with it a wealth of technical know-how dealing with a wide variety of production and design problems . . . available to you as a gratis service. More than 25,000 sets of dies "in stock" at our plant offer the greatest range of selectivity.



STAMPINGS

Our equipment for handling contract production of stampings includes presses for blanking, forming, drawing, shearing and extruding. In many cases it is possible to produce stampings at a lower cost than they can be produced in your own plant, with our own equipment. Our own tool and die-making shop enables us to make up the necessary tools to fit your specifications.

We are equipped to furnish stampings in any desired materials and finishes, ranging in size from small parts to large heavy-gauge pieces. Our engineering staff will be glad to co-operate with you in every way consistent with economical and efficient production.

• • •

Send us your blueprints for quotations on special washers and stampings made to your individual specifications. Write for copy of 76-page Catalog "30" with tool list and complete round washer specifications.

WROUGHT WASHER MFG. CO.

THE WORLD'S LARGEST PRODUCER OF WASHERS

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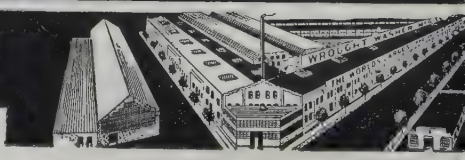
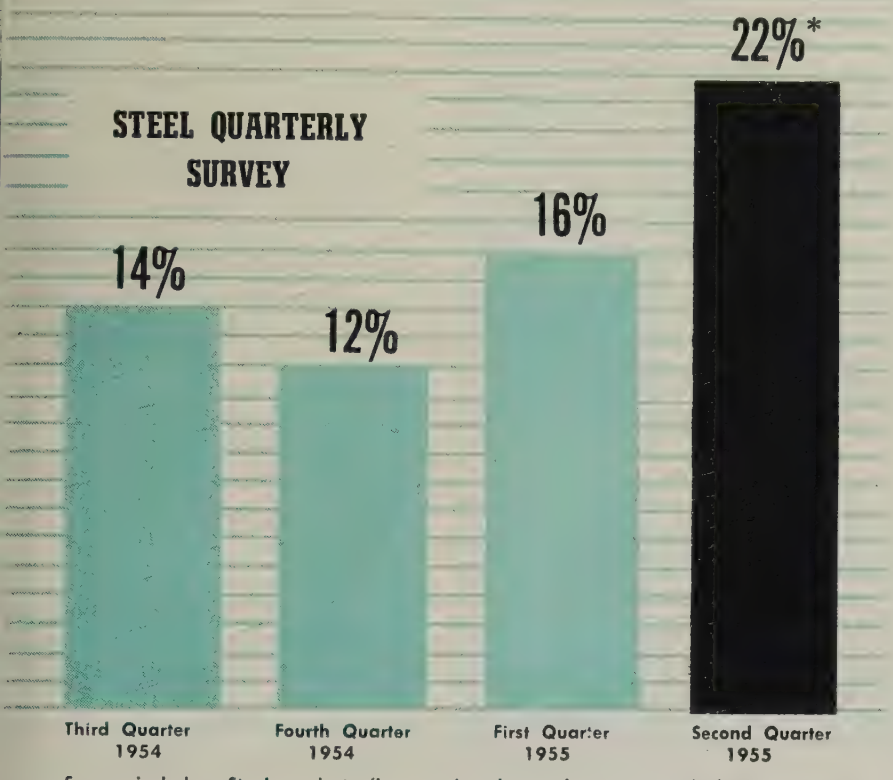


A8247-IP

Steel, Copper, Aluminum

(% of respondents who added to inventories)



Survey includes: Steel products (bars, strip, sheet, plate, structural shapes, wire, tubing), pig iron, copper and brass mill products, copper wire and cable and aluminum products.

*Preliminary

Shortages Slow Inventory Growth

TIGHTER DELIVERIES are by far the most striking feature of STEEL's latest quarterly survey on steel, copper and aluminum inventories. "If business continues at its present pace, we'll shift from a buyers' to a sellers' market," comments one metalworking executive.

Many plants are finding themselves in the position of a Pennsylvania firm. Its purchasing agent reports: "Mill deliveries have stretched out, bringing about an inventory shortage in our plant."

No Relief—In other cases, the cause is different, but the result is the same. As another PA puts it: "Our situation inventorywise has become critical due to an influx of new business."

Little easing of the tight situation is looked for in the coming quarter. Here's the way a production manager views the situation: "Although our inventory will be higher three months from now, it's not expected that steel mill deliveries will be adequate to fill production on increased bookings promised our customers for third-quarter delivery."

Speedy Change—One of the most impressive aspects of the "new" delivery status is the rapidity with which it developed. As recently as three months ago, only 1 per cent of respondents considered their deliveries unsatisfactory. In the latest survey, over 25 per cent feel that way. One PA says deliveries of carbon and alloy bars have extended two months since the last STEEL survey (Feb. 7, p. 65).

An indication that the situation may get worse before it gets better is the fact that almost 70 per cent of the replies noted difficulty in getting one or more of the surveyed items (see chart).

Headaches — Most trouble was encountered in finding enough light plates; 47 per cent of users listed them as hard to get. Forty per cent of the buyers weren't satisfied with deliveries of hot and cold-rolled sheet and strip, heavy plates and standard structural shapes.

A quarter of users were having headaches with stainless sheet and strip, while one in five reported difficulties in getting enough seamless tubing, copper and brass mill products, copper wire and cable, aluminum and silicon sheet and strip. Galvanized sheets were giving trouble to 17 per cent.

Stocks Grow—About 90 per cent of the users found the rest of the list in adequate, if not plentiful, supply.

The long-awaited trek away from hand-to-mouth buying apparently got under way in the first quarter. The most noticeable change was in the under-ten-day group, which shrank considerably.

Changes — The fastest growing category is the 30-to-60-day class. That classification absorbed some of the escapees from the hand-to-mouth buyers who three months ago had less than a 30-day inventory. But also moving into the group were substantial numbers of consumers formerly in the 60-to-90-day class. Gains and losses about balanced each other among users having three-to-six month inventories.

But in spite of the trend away from the hand-to-mouth class, most users want to make sure tight deliveries or rising business, or both, don't put them back there. Some 22 per cent will build up stocks during the coming three months (see chart). Roughly 65 per cent will hold at present levels.

Optimism — Of those planning more buying, 90 per cent feel it will put them in a better business position, or at least will keep them in the same relative position they hold now. Some of the remaining 10 per cent say they'll be worse off even with higher inventories because they can't build stocks fast enough to keep ahead of new business.

Of those who expect to have

lower inventories at the end of the second quarter, fully half say this will put them in a poorer business position than they are in now. Most of those are cutting down involuntarily. Only 20 per cent think lower inventories will leave them better off.

Republic: Changes Coming

Many company plants will receive a share of the $35 million slated for improvements

REPUBLIC STEEL CORP. will spend $35 million for new equipment and facilities.

Major items included in the new expansion program are: 1. Production machinery for the Gadsden, Ala., plant. 2. A by-product coke oven battery for the Massillon, O., steel plant. 3. Equipment to produce over 650,000 feet of plastic pipe per month and additional units to allow steel pipe from ¾ to 4 in. to be coated with plastic for special uses. 4. Facilities at the Warren, O., plant to permit a 1500-ton-per-month increase in silicon strip production. 5. Necessary equipment to open up the Genesee ore body in northern Michigan.

Lesser Lights—More than a dozen other projects will be undertaken at various plants to increase efficiency. Two blast furnace stoves will be modernized and equipment, such as electric transformers, motor generator sets and continuous coal mining machines, will be put in service.

"Expenditures in postwar years have put our plants in first-class operating shape, and we intend to keep them in that condition," states C. M. White, president of Republic. "Our continuing market study is keeping us posted on what products the steel consumer desires most and which products are in shortest supply. It is also giving us solid data on which to base predictions for future needs, so we will be ready to meet them."

Kaiser To Buy Pipe Plant

Kaiser Steel Corp., Oakland, Calif., will purchase the Steel Division of Basalt Rock Co. Inc., Napa, Calif. Two plants are involved, one at Napa, the other at Fontana, Calif.

Machine Tool Outlook Bright

Energy expansion, realistic appraisals by industry and governmental spending are going to keep orders at a high level for tool builders

OUTLOOK for the machine tool builder is excellent. Industrial leaders, speaking before the 19th Annual Machine Tool Electrification Forum sponsored by the Westinghouse Electric Corp., gave some of the reasons why.

Sales are running over $60 million a month. New orders placed last year totaled $560 million. Federal, long-lead-time programs have appropriated $84 million to the Air Force, $15 million to the Navy and $1 million to the Army. The General Services Administration is spending $40 million for elephant tools, and a Navy Propulsion Program calls for expenditure of $45 million.

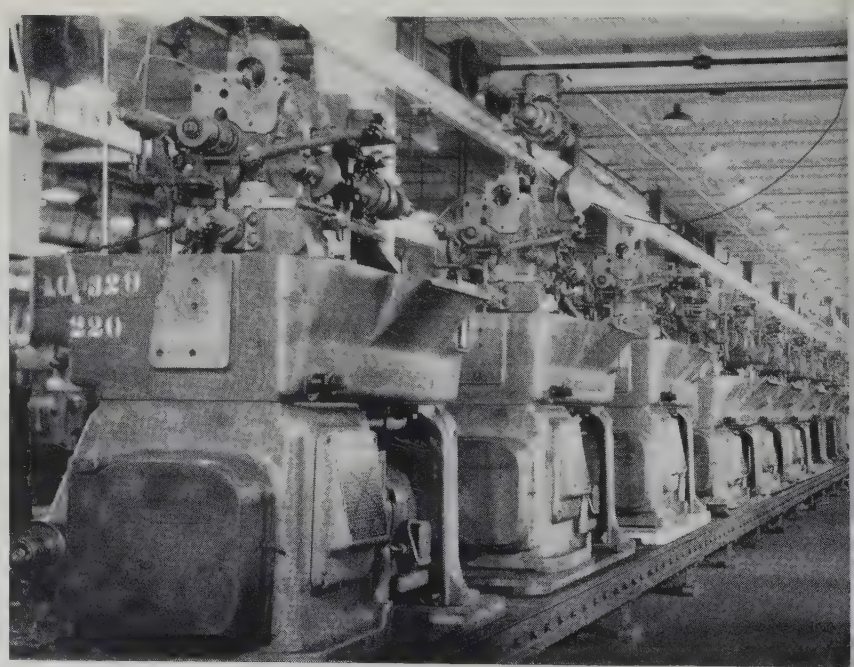
This government spending, coming over the next 18 months, adds to the stability of the machine tool outlook.

Appraisals Help — Tell Berna, general manager, National Machine Tool Builders' Association, told STEEL: "More and more companies are taking a cold-blooded appraisal of their operations. Works managers now can submit appraisals which estimate savings a year in advance on individual machine tools. This helps sell management on re-equipping. The days of allowing a machine to operate for years simply because it gives little or no trouble are gradually disappearing."

Another indication of industrial growth is shown in the expansion of energy requirements. On the basis of projected demands, it is anticipated that the installed generating capacity in 1965 will be 215 million kilowatts. Energy sales will total some 850 billion kilowatt-hours.

Progress Assured—H. N. Muller Jr., assistant to vice president-engineering, Westinghouse, states: "Beyond any reasonable doubt, the trend toward more machines and more power and less men and muscles per unit of output will continue in our factories . . . this is a virtual guarantee to the machine tool and equipment industry that their expansion will keep pace with the estimated power expansion."

The critical review of machine tools being conducted by the Navy



Brown & Sharpe Mfg. Co.

Incoming orders will keep machine tool lines filled

ureau of Ships also is helping the overnment organize and adopt an rderly replacement program. It anticipated that the Army and ir Force will introduce similar urveys within the next few weeks.

Percentages—"The gross nation- product is increasing at a rate f 3½-per cent a year, but the merican working population is ncreasing at the rate of only 1.8 er cent a year," reports D. C. urnham, vice president-manufac- uring, Westinghouse. "Automatic rocesses (machine tools and equip- ent) will help the worker by pro- iding him with a means of being ore productive."

Trump card for this year is still he machine tool show coming up n September. It should help boost ourth-quarter sales.

A Pipeline for Coal

Pittsburgh Consolidation Coal o. soon will start building a pipe- ine to transport coal. It will run rom the company's main Ohio perations, near Cadiz, to the leveland area. Estimated cost is etween $9 and $10 million. The ipeline will be built in 18 months. A definite capacity has not been decided, but it will be able to ransport a minimum of 1.2 mil- ion tons of coal annually. It will e conveyed in a slurry form.

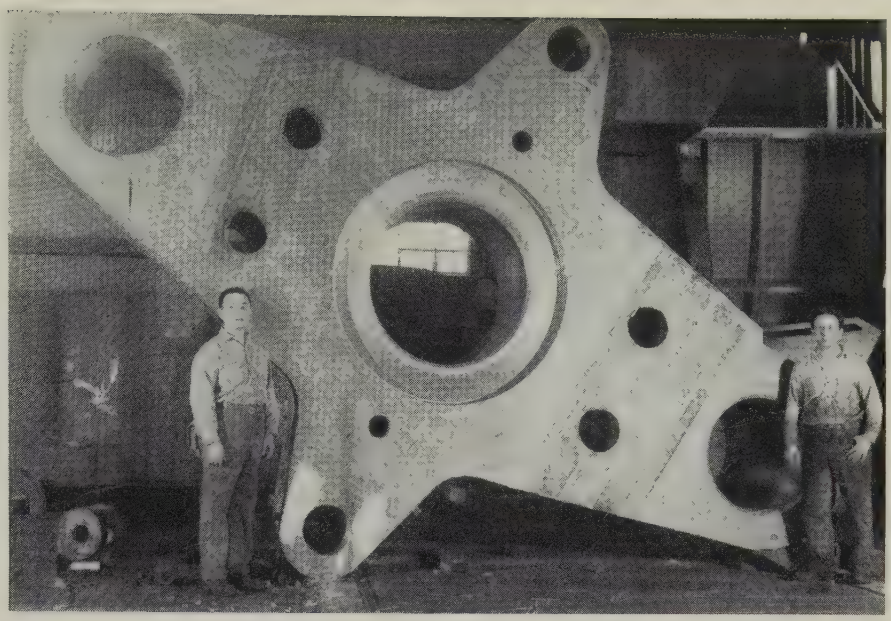
Atomic Power Cost Drops

Foster Wheeler Corp. says it an build an atomic power plant f 100,000-kw capacity for $21 million. The cost previously given or a plant this size was $25 mil- ion. A conventional plant would ost $17 million.

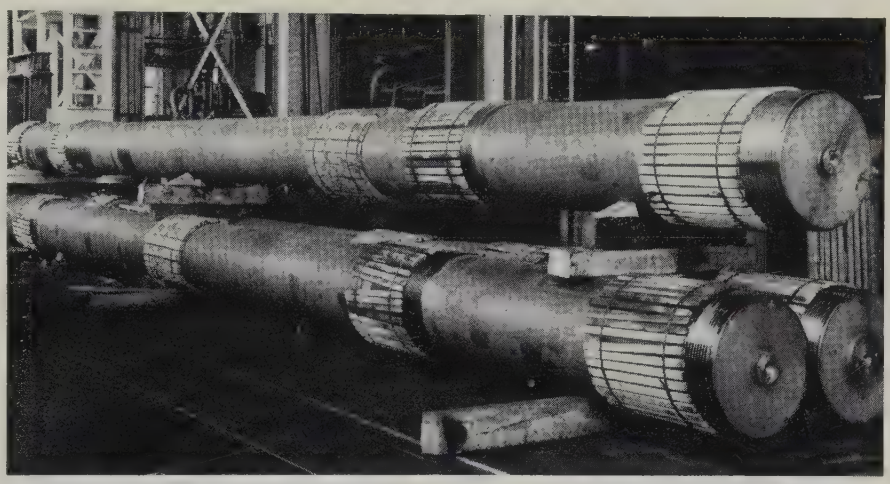
Estimates of the cost of atomic ower have been based on 9 mills er kw-hr. About half the con- entional power plants built since he war produce electricity for bout 6 mills per kw-hr. Cost of ower in the proposed plant will e between 6 and 9 mills.

Working Capital Hits Peak

A new high, $95.8 billion, in orporate net working capital was eached Dec. 31, 1954, states the ecurities & Exchange Commission. nventories were reduced $2.8 bil- ion.



Cast steel crosshead of Lombard Corp.'s 12,000-ton, aluminum-extrusion press



Press columns weigh 50 tons each. Unit will be one of biggest built in U. S.

12,000-Ton Squeeze Nearly Ready

NEWEST addition to the Air Force's Heavy Press Program will be proved out in Youngstown next month by the Lombard Corp.

If the "Big Squeeze" lives up to its designers' hopes, it will extrude aluminum bars up to 70 in. long into a variety of shapes.

Economics — The Air Force schedule calls for the press to be operating by August at Harvey Machine Co.'s Torrance, Calif., plant. It will be put to work on one-piece wing spars and other major aircraft components now made by assembling dozens of smaller pieces. Later, it will also be used to work steel and titanium. A companion unit, installed at the Curtiss-Wright plant in Buffalo, already is squeezing out steel propeller blades. (For other heavy press news, see page 70.)

Col. D. S. Simcoe Jr., heading up the Air Force program, points out that savings include: 5 to 10 per cent of the total dollar cost of a heavy bomber, 5 to 8 per cent reductions in weight and up to 35 per cent in machining costs.

Example—One aircraft component originally required 1600 lb of material costing $18,000 to machine to finished form. A 321-lb forging from one of the big presses will cut machining costs to $500 and save better than 1200 lb in raw material.

Metalworking: Earnings High

Incoming orders assure a healthy backlog for the second quarter. Most metalworking firms had a good first period. Some racked up record gains

MOST METALWORKING firms saw their earnings spiral in the first quarter. A few firms lost ground in sales and net earnings, but the majority now is thinking in terms of a near-record year.

GM Up—General Motors Corp. registered the highest level of sales and earnings in the company's history. Net sales came to $3,101,000,000. This compares with $2,410,000,000 in 1954. Harlow H. Curtice, president, states that the weekly pay of GM's wage earners averaged $103.79—another record for the company.

Aluminum Co. of America more than doubled its first-quarter earnings over last year's. Net income for the first quarter of this year was $17,074,167, compared with $8,372,105 during the same period in 1954.

Some Down—A slight decrease in sales is reported by Thompson Products Inc. Blame is placed on aircraft-part shipments which suffered substantial reductions. A record volume of automotive business did much to make up the difference. Net earning for Thompson still show a slight gain (see chart) over last year's.

General Electric Co. came within 2 per cent of reaching a record high. Profits for the first quarter amount to $50,569,000—a 5 per cent gain over the first quarter of 1954. Ralph J. Cordiner, president, reports: "In view of the company's first-quarter earning results, we are hopeful that with uninterrupted production for the remainder of 1955 it will be possible for the company's sales to establish a record."

FIRST-QUARTER EARNINGS OF SELECTED MANUFACTURERS

	1955	1954
Allis-Chalmers Mfg. Co.	$5,920,165	$5,598,663
Aluminum Co. of America	17,074,167	8,372,105
Borg-Warner Corp.	9,151,118	5,001,506
Budd Co.	4,614,525	1,330,639
Carborundum Co.	1,383,161	756,332
Eaton Mfg. Co.	3,295,277	2,597,433
Fansteel Metallurgical Corp.	486,224	212,983
General Cable Corp.	1,382,380	1,280,663
General Electric Co.	50,569,000	48,029,000
General Motors Corp.	309,000,000	189,167,333
Greenfield Tap & Die Corp.	179,616	177,421
IBM Corp.	11,401,947	10,134,429
Kaiser Motors Corp.	1,207,113	*7,509,340
Minneapolis-Honeywell Reg. Co.	3,728,240	3,950,399
North American Aviation Inc.	8,625,000	6,070,000
Reynolds Metals Co.	7,116,259	4,353,734
Rheem Mfg. Co.	1,562,906	1,426,506
Rockwell Spring & Axle Co.	4,002,041	2,689,155
Signode Steel Strapping Co.	707,000	521,000
Smith-Corona Inc.	215,294	34,549
Thompson Products Inc.	3,351,406	3,268,541
Timken Roller Bearing Co.	4,990,695	3,012,580
Titan Metal Mfg. Co.	552,653	485,260
Union Carbide & Carbon Corp.	28,397,079	21,443,770

*Net Loss

With first-quarter results in, industry (see page 81) is becoming more and more optimistic that this year may be a record breaker.

Steel: Earnings Up

First-quarter returns set stage for the prediction: "Second best year"

THE STEEL industry will operate at 85 per cent of capacity—or a little better this year than last. The prediction comes from Benjamin F. Fairless, chairman, U. S. Steel Corp. Mr. Fairless estimates that some 108 million tons of steel will be shipped.

U. S. Steel produced 5,778,196 tons in the first quarter of this year, an increase of 225,242 tons over the first quarter of 1954. Net earnings for the first quarter were $72.7 million. This compares with $44.8 million for the corresponding period in 1954.

Cutback—Mr. Fairless reports that curtailment in demand for steel by the automotive industry, the largest consumer, would not be fully offset by any prospective increases in buying by other industries. But he believes that demand from the other consuming groups would be sufficient to provide a satisfactory volume of business for the remainder of the year. However, to date there has been no sign of a cutback in orders from the automotive industry, he states.

U. S. Steel's backlog, as of Mar. 31, was 6,261,000 tons. Three months before, the total was 3,854,000 tons.

Expenditures for additions to and replacement of facilities during the first quarter totaled $50 million. Projects to be completed will require an additional $433 million.

The steel corporation chairman also predicts a rise in foreign shipments from 3 million tons in 1954 to 3.7 million tons this year.

Armco, Too—Armco Steel Corp.'s sales and earnings also jumped. Charles R. Hook, chairman, reports that the company earned $12,589,123 in the first three months of this year. This was a 39 per cent increase over the first quarter of 1954. Armco has been operating at capacity since the first of the year.

The Picture Changes in Industrial Photography

AMATEUR PHOTOGRAPHERS re stepping out of their "hobby-t darkrooms" to give industry n assist with company photog-aphy—one reason why a larger lice of last year's photo equip-ient sales of $800 million went to ndustry.

Making motion pictures for ime - and - motion studies, work implification, safety and training nd similar applications requires bout the same equipment and echniques employed by the ama-eur, say officials of Bell & Howell o., Chicago.

Amateur's Willing—Every plant, hey point out, has several ama-eur photographers who can pro-uce most of the company's films nd still pictures.

Outlay for the basic equipment s modest (see checklist). For bout $2000, a company can pro-uce its own 10-minute, sound-olor movie. Eastman Kodak olor film sells at $10.45 for a 100-t roll of 16-mm film. The price ncludes film processing. Sound, roduced on a magnetic recorder, an be added for as little as 2½-ents a foot.

Developments — Introduction of ide-angle and telescopic lenses, igh-speed film and sound-record-ng equipment is making it pos-ible for the skilled amateur to do more professional job. A new ilmoRama lens attachment also permits conventional cameras to take wide-screen pictures.

Word of Caution—A company amateur will be able to produce most movies—not all. Some films require the equipment and know-how of the commercial studio and should not be attempted by an amateur. A rule-of-thumb-cost for commercial movies: $1500 up per running minute of film.

Graflex Inc., Rochester, N. Y., reports that industry also is buying more equipment for still photography. More companies are making their own employee identification shots, as well as pictures for advertising, sales, safety and training courses.

Graflex officials say that $500 will purchase the basic still equipment.

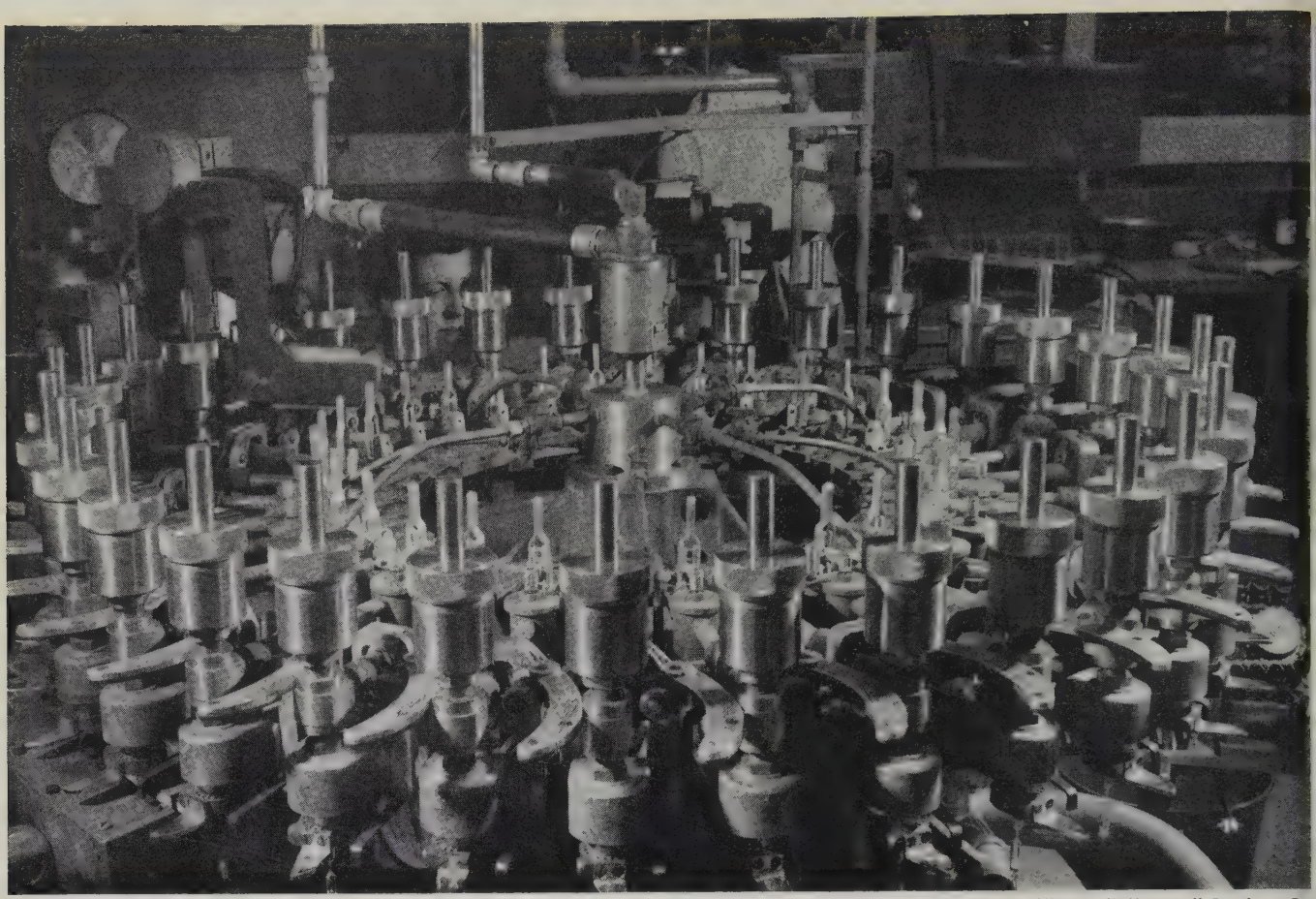
Remember This—If your company is considering doing its own photography, there are numerous firms which have field representatives or dealers available to advise the amateur.

For less than $2000, you can . . .

Take Your Own Industrial Movies

Camera with f/2.5 lens	**$341.50**
telephoto lens	**84.95**
wide angle lens	**86.95**
viewfinders	**22.00**
Tripod	**47.00**
Four light bars & case	**18.75**
Magnetic recording projector	**719.00**
Portable screen, 45 x 60	**39.95**
Editor and splicer	**155.95**
Four rolls color film, 16 mm	**41.80**
Exterior magazine	**162.50**
Footage counter	**55.00**
Total basic investment	**$1775.35**

*Based on Bell & Howell photo equipment prices



Minneapolis-Honeywell Regulator Co.

"How can we miss?" asks Micro Switch. It's . . .

Riding a Technological Boom

FROM JUKE BOXES to military rockets—that's the range of applications for the products of an organization which has grown from nothing in the early 1930s to a multimillion-dollar division of Minneapolis-Honeywell Regulator Co. today.

Micro Switch has become so well established that it's concerned its name will become a generic term for precision switches.

Exception—Despite the general business slump last year, Micro Switch's sales in 1954 were 11 per cent above the 1953 level.

"Last year sales hit an all-time high," says Frank E. Wilsey, general sales manager, "and we're certain to set another record in 1955."

Sales Philosophy — Micro isn't complacent. It has a 70-man field sales force. "Our sales effort is about 50 per cent selling the product and 50 per cent helping the customer engineer for the switches," Mr. Wilsey points out. "We'll go further to persuade a customer not to use a switch for the wrong application than we will in selling him the switch. That's obviously just good business.

"Some business machines, for example, take several hundred switches. Micro switches play an important part in raising and lowering of aircraft landing gear; they count the revolutions of the mixing drum on concrete mixing trucks; they help record, sort, gage and control operations in almost limitless applications."

Expansion — President W. W. Gilmore explains: "Companies have to continue to grow or they go downhill. Few can remain on a level plane." Micro's status is evident: It's expanding its sales force, expanding its engineering department and recently has established a new market research department.

Staying on top of the market includes keeping abreast of industrial developments. When subminiaturization first took hold of industry, Micro felt it had no switch that was applicable to the industrial field. So it built a switch and went out to find a market. One of its first applications was in the mechanism of military rockets.

Background—Micro Switch has changed owners three times since it was formed as Burgess Laboratories in 1932. In 1936, under Walter B. Schultz, Mal Eaton and Arthur Riche, it was given its present name. During the war, these men sold to Commercial Investment Trust as a means of getting expansion capital. In the spring of 1950 the company was sold to Minneapolis-Honeywell Regulator Co. This led to the introduction of a line of mercury switches in 1953, most of which go into M-H products.

Outlook — What's Micro's outlook? "It's all good," officials emphasize. "Our military demand is

ll strong. Electronic develop-nt shows no sign of slowing; the nd toward more automatic ma-inery is gathering momentum. ow can we miss? Those are our g markets."

nion Membership Breakdown

If the AFL and the CIO merge xt fall, craft unions will be the ggest single force within the or-nization, with 33 per cent of to-l membership. So states the Na-nal Industrial Conference Board a labor survey.

Unrestricted unions, which can cept members from many indus-ies, crafts and trades, will have e next largest contingent, with .8 per cent of total membership. dustrial unions run third with 26 r cent. A last group, with 14.5 r cent of total members, is made of unions which are basically aft but which frequently organize oduction workers on an industrial asis.

Of the 93 craft unions in the oposed federation, 88 are from e AFL and five from the CIO. f the 48 industrial unions, 26 are om the AFL and 22 from the CIO.

inal Tally on 1954 Strikes

Strikes stopped production 3468 mes during 1954. This informa-on is based on all work stoppages nown to the Bureau of Labor Sta-stics which involved six or more orkers and lasted a minimum of full day or a shift. There were 091 such stoppages in 1953.

Average length of shutdown was 2.5 calendar days and some 1,530,-00 workers were affected. The anufacturing industry lost a total f 13.7-million man-days, while onmanufacturing concerns lost 8.9 illion.

obless Pay: States Vary

How well an unemployed man ares depends not only on the state e lives in but also on whether e's married or not. In Michigan and hio, married men with children et a better deal than bachelors, hows an analysis by the National ndustrial Conference Board. In lichigan, maximum benefit for a ingle man is 48 per cent of normal ake-home pay. A married man with two children can get up to 57 per cent.

The reverse is true in Texas, Illinois, California, Indiana, New Jersey, Pennsylvania and New York—the other industrial states covered. In Pennsylvania, after taxes and dependent's allowances are figured, up to 60 per cent of normal take-home pay can be drawn by an unemployed bachelor making a gross wage of $70. A family man is limited to 54 per cent.

General Dynamics To Merge

Stromberg-Carlson Co. and General Dynamics Corp. will merge upon approval of stockholders at special meetings on June 28. The plan is to exchange stock share for share. John Jay Hopkins, board chairman of General Dynamics, said Stromberg would retain its name, individual identification and organizational structure. The merger reflects the interest of General Dynamics in broadening its operations in electronics.

ODM Totals Tax Write Offs

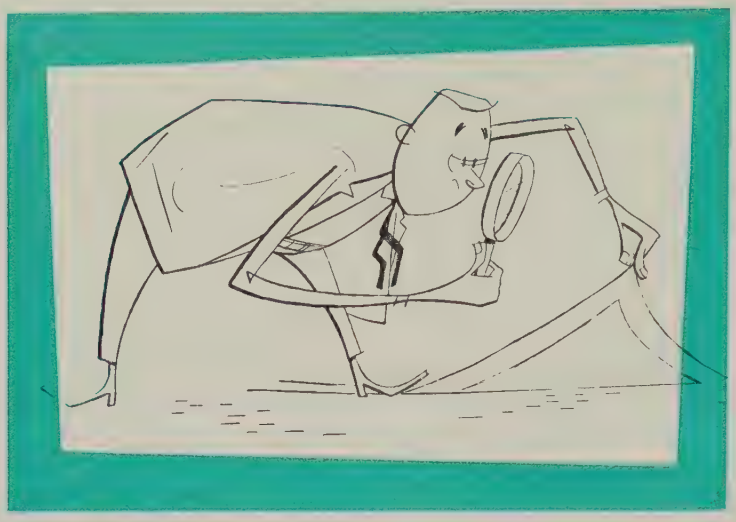
The Office of Defense Mobilization approved 18,545 industrial expansion projects for rapid tax amortization as of Sept. 30, 1954. Total proposed cost—$29.5 billion. Of this, 86 per cent ($25.3 billion) was completed by Apr. 1, 1955.

No Lost Time Cuts Shipping Costs

COSTS of pickup and delivery of less-than-truckload lots can be reduced up to 20 per cent if delays at shipping and receiving docks are eliminated.

A study made for the trucking industry by Drake, Startzman, Sheahan and Barclay, New York, gives these rules for shippers:

- Centralize authority for all traffic functions, so that problems can be dealt with immediately and effectively.
- Schedule shipping and receiving to eliminate varying demand for labor, reduce congestion and avoid errors caused by the last-minute rush.
- Use improved handling methods.
- Have adequate facilities.
- Lay out storage area for maximum flow efficiency. Aisles should run perpendicular to the truck edge, with one aisle centered on every two trucks.
- Segregate shipment by individual carrier.
- Keep packages down to the weight one man can handle.
- Markings should be clear, accurate and complete.
- Insist on legible bills of lading.
- Tell your carriers how much freight you have and when you want it picked up.
- Assist truck drivers with larger shipments. When receiving, have a checker ready. When shipping, have bills ready. Help get the driver in and out quickly.
- Check freight carefully when it is floored in the shipping department, so that the driver has to make only a total-piece count.
- Large shippers should prepay freight charges. This reduces invoice handling by the carrier, saving time and costly errors.



Nickel Mystery: ODM Seeks Clues

■ WHAT'S happening to nickel? That's the major metal puzzler in Washington today. For some mysterious reason requirements for military and Atomic Energy Commission equipment have gone up every month since the first of the year. Indications are that the military-AEC take in May will rise 80 per cent over April.

Elimination—Governmental buying has been fairly steady for the last four months. No explanation lies there for the increases. Fabricators always fight for more nickel in their steels, and they probably are specifying more of it. But even this factor could not account for an 80-per-cent jump in one month.

Mobilization planners believe privately that some companies doing military and AEC business must be padding their requirements.

ODM Help—The Office of Defense Mobilization is making an additional 1 million lb of nickel available to industry each month in April, May and June. Despite that, the amount of the metal available for commercial use probably will slip this month.

Nickel has not been under governmental allocation for the last 18 months. And there's no sign that its distribution will return under Washington's wing. But ODM will try to find the facts behind the metal's new spurt in popularity.

Machine Tools

■ Further delay in placing machine tool orders will result in the ODM ruling that the armed services must first try to buy from the General Services Administration pool of tools. Only 673 units are left under the program started during the Korean War when tools for the government were bought through a pool to eliminate duplication. Now the U. S. wants to get rid of those that are left. The ruling is applicable to equipment to be purchased under the Vance program. Now, before an order can be placed with a builder, a search must be made to see if GSA has the equipment or anything like it.

Tool Pool Rule

■ The GSA pool ruling may spark an investigation on Capitol Hill of the government's equipment-buying policies. The most likely investigator: Sen. John J. Sparkman (Dem., Ala.) and his Small Business Committee. The basic issue is whether the U. S. should act as just another machine tool customer or whether it should use its position as a means to keep a basic industry healthy. The point has been raised that order delays brought about by such actions as the GSA pool situation won't help the industry.

Halethorpe Decision

■ The Defense department will make its decision about the Halethorpe, Md., heavy presses late this month. Kaiser Aluminum & Chemical Corp. originally was supposed to operate the Air Force units, but then it was decided to open the job to bidding. Kaiser, Reynolds Metals Co. and Harvey Machine Co. have submitted bids. No matter what happens, Kaiser will continue to operate a plant adjacent to the press facilities. Some observers wonder how a company other than Kaiser can efficiently operate the press plant separately. If Harvey wins, that will give the firm its first toehold in the East.

Meet William Meissner: Deputy director of the copper division of Business & Defense Services Administration, his career includes both governmental and industrial service. He has been associated with the copper industry for more than 30 years, having started in 1922 as a foundry laborer with Republic Brass Co., Cleveland. He was a commander in the Navy during World War II, serving as officer in charge, Nonferrous Metals Raw Materials Division, Bureau of Ships.

He can be reached in Washington at Sterling 3-9200, Ext. 4117.

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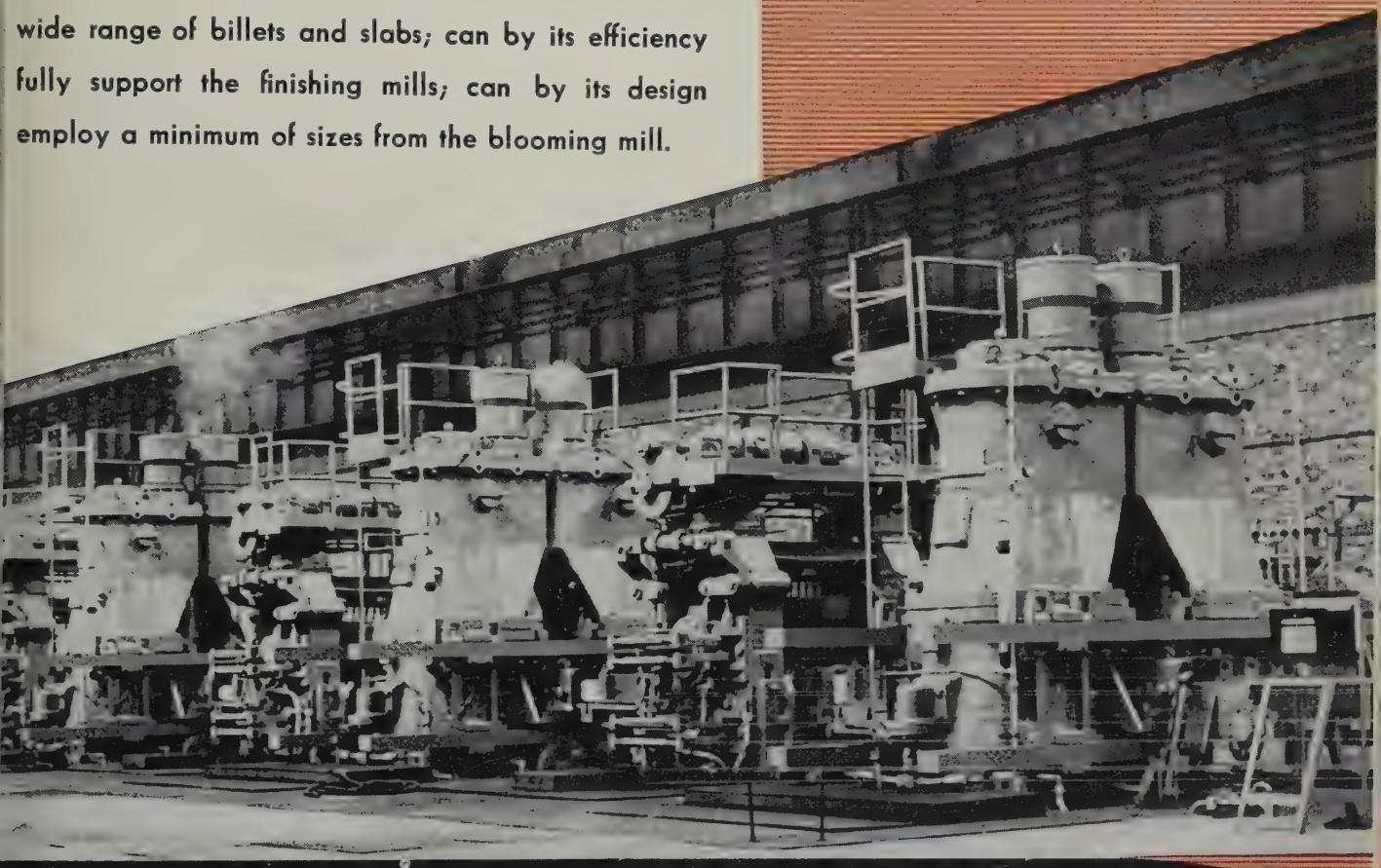
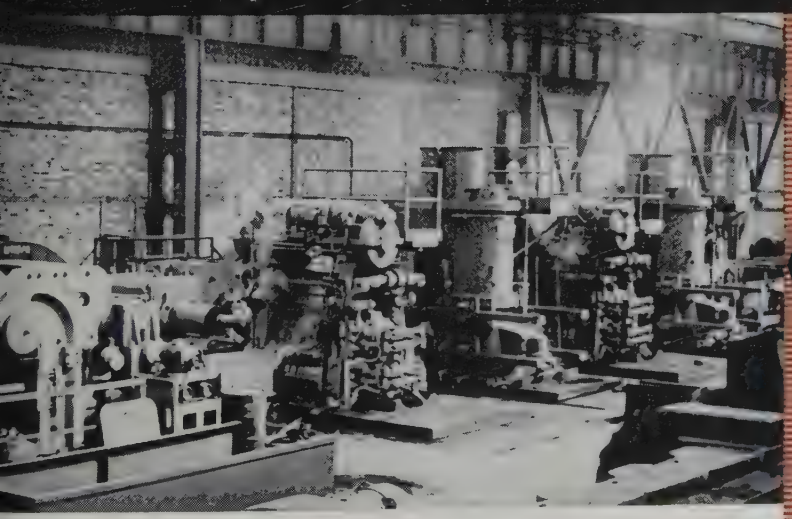


ett Iron Works, Durham, England, a 6-Stand 30" Vertical-Horizontal Mill finishes larger sizes and also rolls Process Sections for . . .



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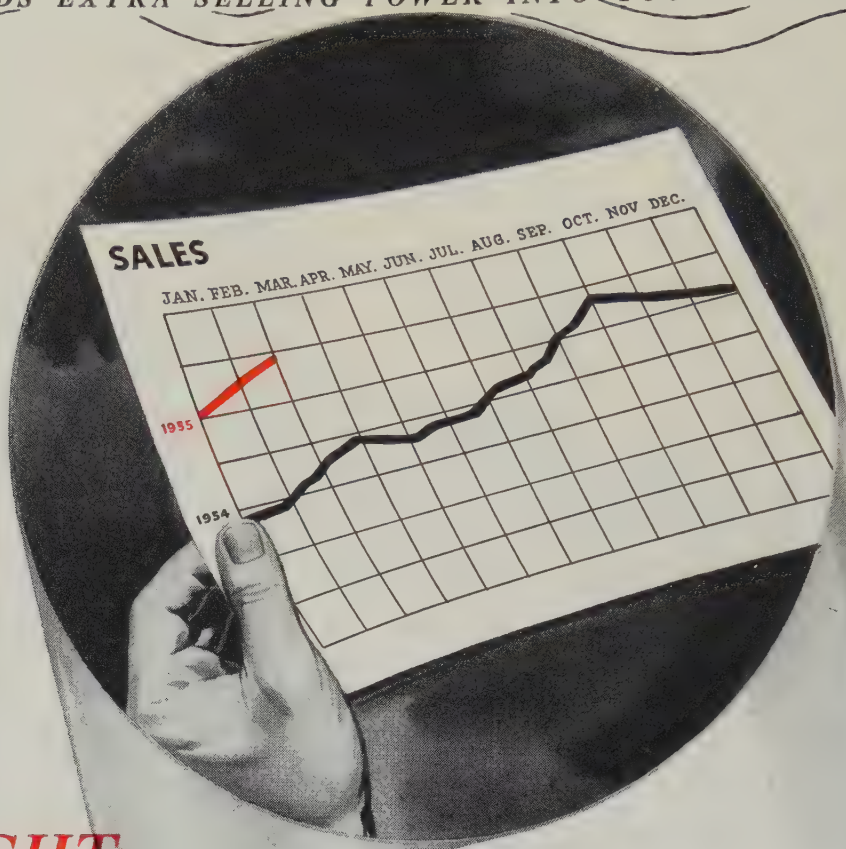

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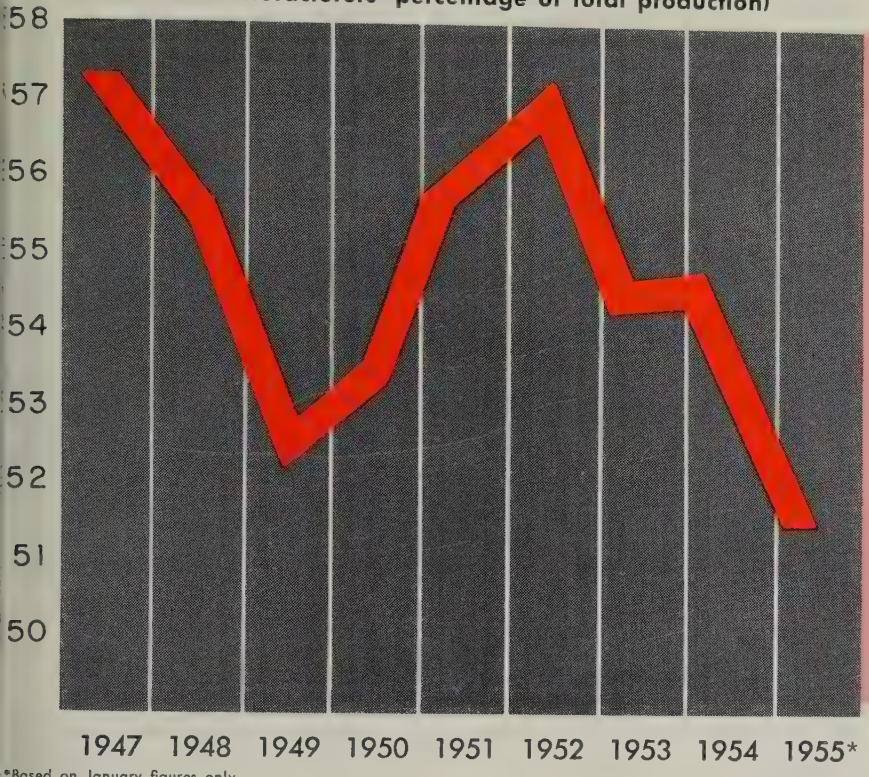
SM-39

How Job Shops' Share in Gray Iron Output Has Changed

(contract manufacturers' percentage of total production)



*Based on January figures only.

Tonnage Output in Gray Iron

	Total Production	Job Shop Production
1955*	1,092,000	563,000
1954	11,532,000	6,323,000
1953	13,708,000	7,495,000
1952	12,869,000	7,372,000
1951	14,988,000	8,450,000
1950	12,906,000	6,880,000
1949	10,549,000	5,521,000
1948	12,786,000	7,131,000
1947	12,540,000	7,181,000

*January only.

Job Shops: Six Paths to Profit

Contract manufacturers are worried about unsatisfactory earnings. A STEEL survey of ten progressive jobbers reveals these major factors for success: Better facilities and selling, know-how, engineering, economy and diversification

"JOB SHOPS are the buck privates of the industrial army."

That's the half-humorous definition of contract manufacturing by one executive in the business. But he's half-serious, too.

The Worry—He and others who make tooling, produce parts or perform services to the order of other manufacturers are concerned about dependence upon their customers. Contract manufacturers see competition rising, prices and profits generally slipping and break-even points climbing.

Nobody knows just how many job shops exist among the 56,000 metalworking plants in the U. S. Tabulation is difficult because many are both contractors and users of their own product. Mullins Mfg. Co., Warren, O., for example, is a stamping contractor, but it also uses its own stampings to build kitchen cabinets. Probably more than half the 56,000 plants do some contract manufacturing.

Competition — Of about 6000 foundries in this country, 75 per cent are principally job shops. Yet they make only an estimated 55 per cent of all castings produced. Castings users turn out the rest. Therein lies a major problem for contract manufacturers. Their share of total production has been dropping since the end of World War II.

The accompanying chart on gray iron ratios is typical of the general job shop experience—no dramatic slide, yet still a slide. It's probably more pronounced, say, in stampings, but less so in screw machine products. Thus, contract manufacturers have a double-edged, competitive problem —competition from their customers with captive shops and from other job shops.

Prices—That competition has forced prices down, or, at the best, has kept them stable over the last 18 months. Stampers last year, for example, saw an average 10 per cent drop in quotations.

That had the inevitable effect on profits. They hit or came close to a postwar low in 1954. They'll be better in 1955 because business is better, but they're still unsatisfactory.

Break-Even Points—Costs have risen for job shops just as they have for everyone else. With prices stable or down, the squeeze is on.

Under the circumstances, what can contract manufacturers do to assure good profits? Plenty. STEEL went to ten of the many job shops it considers successful to learn their formulas for success. Scores of factors and their combinations account for good profits. Six stand out: Better facilities, know-how, engineering service, better selling, economical production and diversification.

Facilities Needed

All ten firms agree that modern equipment is the most impor-

Skilled labor like these tool-and-die men is a major asset for any contract shop

tant (or one of the most important) paths to profit.

Take the case of Columbia Metal Stamping Co., Cleveland. It employs only 75, but it has spent $500,000 since 1943 on re-equipment. Result: Its 1954 volume of about $1.5 million was off only 4 per cent from 1953's, compared with an average 20-per-cent dip for the job stamping industry generally.

Full Capacity—"We were able to fill our plant in 1954," comments Columbia's president, Ambrose E. Koch. "Our slip in dollar volume came entirely because of price cuts last year." This year the company's sales are running about 38 per cent ahead of 1954's.

Superior equipment not only enables a company to do work faster, easier and cheaper, but it should permit a job shop to do special work that few can do. That's the essence of many a contract manufacturer's success. Metallurgical Inc., a Minneapolis heat treater employing 50, finds that 20 per cent of its customers have heat treating facilities of their own. It still gets their work because of its specialized apparatus.

Selling Know-How

"I've been in the plating business for 35 years."

"I've done stamping work for 40 years."

"My father was in the tool and die business all his life, and so have my three brothers and I."

Experience — Those statements are typical of operators in successful job shops. They all have long experience or extensive know-how. They capitalize on those assets.

Bill Lorence has been a plater since 1920. Most of his 36 employees have been with him ever since he started in business for himself in 1942 as Lorence Plating Co. Some were with him even before 1942 when he was foreman or superintendent of other Cleveland plating plants.

Teamwork—"We know what we can do. From long experience, we work well together. That's important to get quality, speed and low unit costs. It's an area where small plants have a big advantage over large ones," he says.

"Once you get good equipment, you have to have well-trained people to operate it," says Mr. Koch, who started his stamping shop training in his teens as a sweeper. A stable work-force with low turnover is a must, he believes.

Family Deal — Even larger job shops, such as Cleveland's Barth Corp., which employs 300, stress company and the employee experience. Selling tools, dies and special equipment, Barth is a family operation (as are many job shops). It's operated by the four Barth brothers, Glenn, Tom, John and Robert.

Engineering Payoff

A third skill common to all good contract manufacturers is high-class engineering service.

"Our chief advantage over another company which has heat-treating facilities but doesn't specialize in that alone," says L. A. Lindberg, "is our technical service." Mr. Lindberg is president of Lindberg Steel Treating Co., which employs 325 at its main Chicago plant, 40 at Los Angeles and 25 each at St. Louis and Rochester, N. Y., facilities.

Consultants—"We have a staff of metallurgists," he points out, "who consult with customers on their jobs. We prefer to be in on the ground floor, so that the customer doesn't make a poor application."

Some contract manufacturers make a business of providing engineering service. H. W. Butterworth & Sons Co., Bethayres, Pa., does, performing design and consultation work on mechanical problems, in addition to its manufacturing.

What Successful Job Shops Recommend

- **Get out and sell the idea that you can do it cheaper.**
- **Check your operations for efficiency. Start a cost-cutting program in production, purchasing, office procedures etc.**
- **Keep pace with modern equipment and techniques.**
- **Don't become too dependent upon plants large enough to install their own facilities—unless you're sure you can keep them sold.**

Salesmanship Helps

Better selling is the fourth common attribute of successful contract manufacturers.

The trend: More publication advertising, more direct mail, more technical literature. Lindberg Steel Treating has a publication, *After Hours*, sent to customers and potential customers, which is designed to show the importance of heat treating in everyday life. It also distributes several customer aids, such as hardness conversion and tempering charts.

On the Road — Many jobbers have more salesmen on the road now than a year ago. Barth, with five then, has seven now, plus a new sales manager and two manufacturer's agents just starting in Texas and California. The sales force build-up is being pursued even though the company expects a sales drop in 1955 because of a marked decline in military orders. Volume this year will be an estimated $3.7 million, compared with $4 million in 1954, $5 million in 1953.

Look, too, for more sales stress on economy. Carter C. Higgins, president of Worcester Pressed Steel Co., Worcester, Mass., and Clement C. Caditz, president of Northern Metal Products Co., Franklin Park, Ill., are outstanding among a group of crusaders selling job shops via magazine articles and speaking tours.

The Economy Theme

Their theme: Make or buy? They and others in the business agree that it often makes sense for a large user of stampings or castings to install his own facilities to make the component, produce the tooling or perform the service.

Reappraisal—But contract manufacturers like Messrs. Higgins and Caditz point out that often the case for "doing it yourself" is not too clear cut. They urge better cost accounting procedures to determine whether the capital expenditure is justified, whether labor would be intelligently used in a peripheral operation, whether quality would be up to a job shop's standards.

"I'm concerned," says Mr. Caditz, "with the plant in which stampings are only an incidental operation. It's that kind of activity that gets little attention, costwise, because it's minor compared with the whole operation."

Opportunity — Jobbers hope to get more business by putting the spotlight on some expensive captive operations. While they're finding that many smaller captive shops are as efficient as their own, they have had considerable success with their campaign. For example, of about 150 gray iron foundries that went out of business in 1954, more than half were captives.

Diversification?

A sixth approach to profit for job shops is diversification—either an end product or through additional contract manufacturing lines.

Not all jobbers favor diversification, but enough do to make the practice common. End-product diversification is the toughest. It involves sales setups that few contract manufacturers have.

Shift — That's why Barth arranged with several of the national electrical supply houses to handle sales of its new portable cable puller. The device pulls wire through conduit and would be used by electrical contractors not normally on Barth's sales beat.

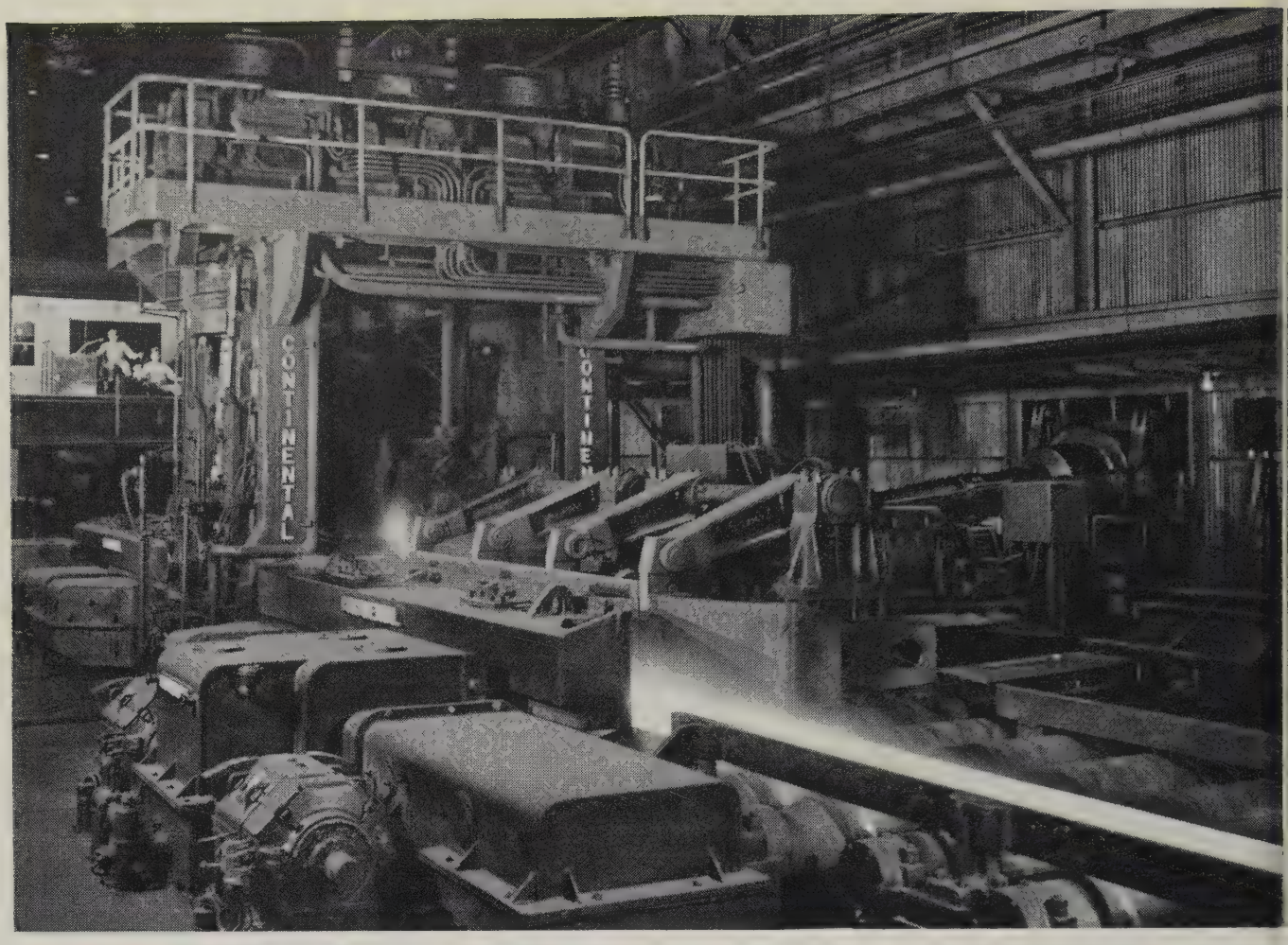
Far more common diversification involves other contract manufacturing. Besides producing tools and dies, Bunell Machine & Tool Co., Cleveland, does production machining. Today, it accounts for about 40 per cent of total sales. Fulton Foundry & Machine Co. Inc., Cleveland, also does job machining, as well as produce gray iron. Machining accounts for about 10 per cent of its sales. An advantage of this kind of diversification: A castings job that requires machining may be landed.

Contract manufacturing capacity increased markedly during and after World War II. The decline in defense work has hit it hard. No wonder a tough transitional period worries job shops.

But they always will be needed. General Motors Corp. spent 52.8 per cent of its 1953 sales dollar with suppliers. Chrysler Corp. spent 65.8 per cent.

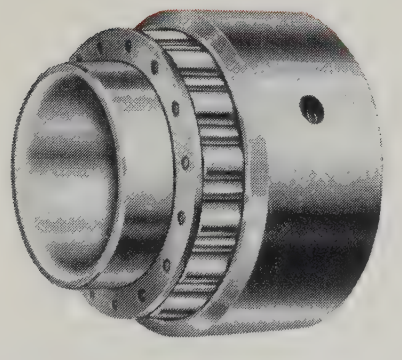
"Contract manufacturers serve as the bellows of industry," said the late James Forrestal, the first secretary of defense. "If they are the buck privates of industry, they are as vital as the enlisted men in any army."

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, 1213 W. Third St., Cleveland 13, O.*



235 HYATTS GET AN EXTRA-ROUGH "WORKING OVER"

in this "dual-duty" Continental Mill



Experienced steel men can see at a glance that this big bruiser is a 40-inch blooming and slabbing mill—and a beauty. But that's only *half* the story!

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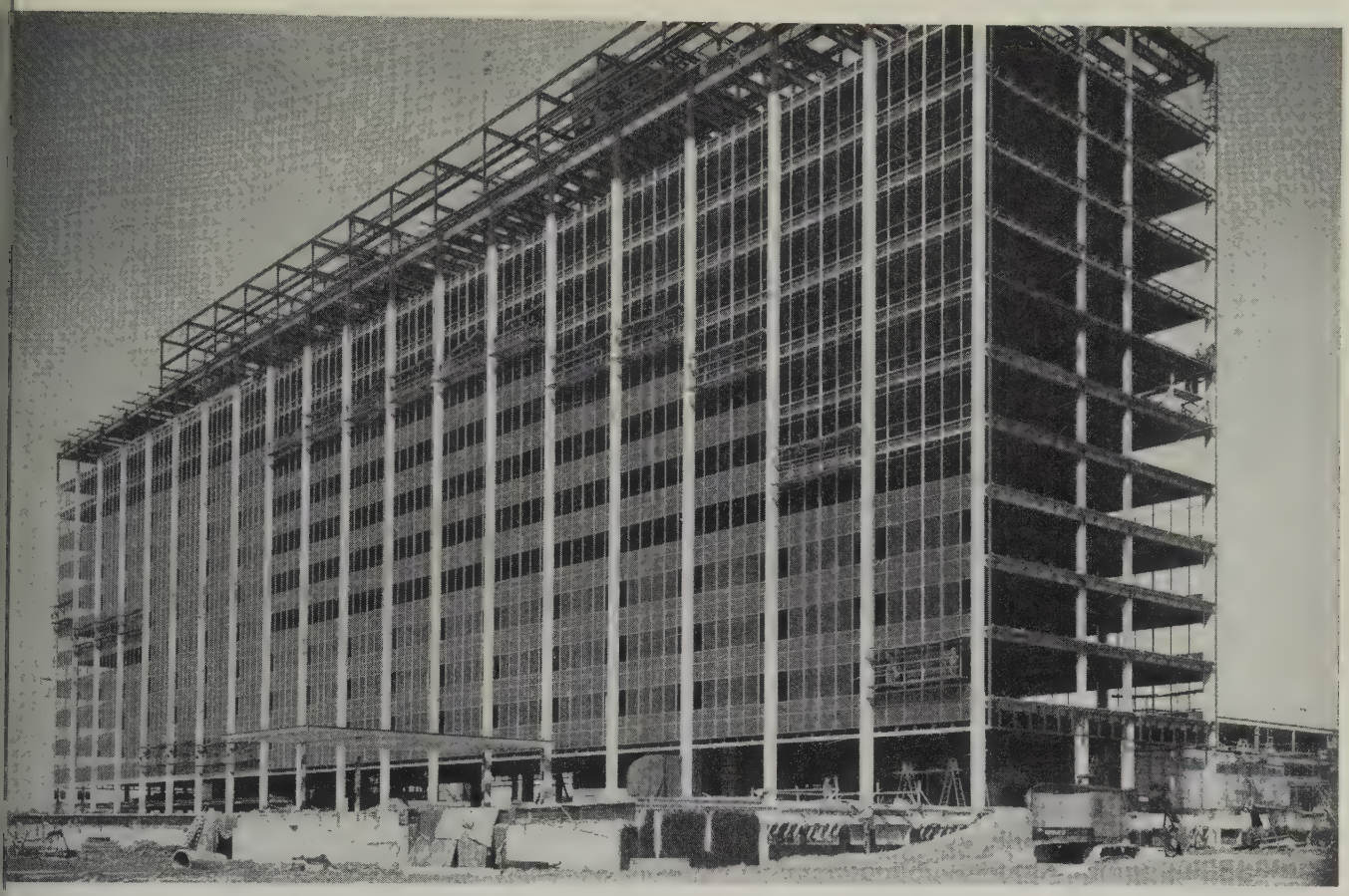

New structures in both management and facilities mean . . .

Ford Takes New Aim at GM

SOMEWHAT obscured by Ford and Chevrolet taking pot shots at each other is the fact Ford Motor Co. is setting increasingly capable sights on the entire line of General Motors values.

Announcement that Lincoln and Continental cars now will be produced by a separate division under William Clay Ford, and that Mercury and "Special-Products-Division" cars will be made by a second division headed by Benson Ford, reaffirms the obvious: Ford is working toward a full line of cars and sufficient capacity to produce them to outrank General Motors.

Background—As recently as ten years ago, equal plausibility would have greeted a report that Ford intended to build plants on the moon. At that time, Ford was a poor third in the Big Three, behind second-place Chrysler and continuing titleholder GM.

Although Ford once held GM's position and the size of its plant and equipment was impressive, most of the Ford facilities were into a second or third decade of service and ready for replacement. According to the divinings of an extremely rudimentary accounting system, the firm was performing the remarkable feat of losing $10 million a month. And as a result, rather than expecting Ford to become a challenger again for the industry's number-one spot, many observers confidently expected the Ford nameplate to become a memory with the company's aging founder.

One Man Show—There was another and more fundamental reason for this belief. From the beginning, the company had only one top man, Henry Ford Sr. Edsel Ford held the title of president from 1919 to 1943, but important decisions continued to be handled by his father.

This was the picture which greeted Henry Ford II when he moved into the presidency in September, 1945. His first step was to fire the ringleaders in the battle for control, creating an acute managerial vacuum. Despite the urgency of the company's need, he moved slowly.

Breech Fills Breach—Almost a year after the ascendency of Henry Ford II a former General Motors boy wonder joined the team—albeit with considerable qualms. Ernest R. Breech, then president of Bendix Aviation Corp. and formerly a GM vice president and group executive, had called on Henry II in an attempt to sell Bendix products to Ford. What he did sell, quite unintentionally, was himself. After investigation, young Ford made him an offer.

But selling Ernest Breech on Ford was something else. He knew

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something of the Ford situation. Declining the first offer, Breech agreed to look over the situation and made recommendations because he hoped to maintain Ford's good will as a potential customer. The more he looked at this headless giant, the more intrigued and appalled he became. Though the firm was doing close to a $1-billion business, he was amazed to learn that no one knew how much it cost to build a Ford car.

There was even some doubt that the firm was in the auto business —what with Henry Ford Sr.'s accumulation of Brazilian rubber plantations, timberlands, soy bean plants, farms etc. Most of these, so far as anyone could guess, were unprofitable. And as has been pointed out, executive management was understaffed at the top and almost nonexistent at the bottom.

Ten Year Contract—To a man from General Motors, the resemblance to a recluse's attic must have been striking — no wonder he was reluctant to tackle the job. In the end, the challenge proved too great, and Breech took the job with a contract which protected him for ten years against being fired or getting fed up. It gave him a free hand in development of the policies and managerial techniques and permitted him to bring in several key men from the outside.

Among them are names like D. S. Harder, Lewis Crusoe and Harold Youngren, all General Motors alumni. At the same time, a new car was being developed for production in only 18 months, in itself a monumental chore. Model for this incredibly broad reorganization move was, of course, General Motors Corp. "The GM way" soon became a byword at Ford.

Autonomy — The GM way involves units expected to behave almost as if they were independent businesses, each responsible for its own profit on its own operations. Competition between the divisions, which overlap, is vigorous and results in costs being driven down and quality being increased.

The Lincoln-Mercury Division, which was established in 1945, was supplemented by the Ford Division in 1949. In 1953 the Special Products Division was formed to develop the Continental car, and in 1954, it was replaced by the Continental Division.

Evolution—Meanwhile, the Tractor and Implement Division was established, and now comes the most recent announcement: The reactivation of the Special Products Division and the split of Lincoln-Mercury into separate divisions.

This latest move will be implemented by separate assembly facilities for the Lincoln and Mercury car lines, including a new Lincoln assembly plant to be completed as soon as possible. The general sales office and field sales organization of the former Lincoln-Mercury Division will be transferred virtually intact to the new Mercury Division, with a new sales office for the Lincoln Division.

Five Cars—The function of the Special Products Division, in the words of Lewis Crusoe, is to "enhance the position of the company and its dealers in the nation's car and truck market," which undoubtedly means another car line. Whether the car developed is aimed at the upper-medium price bracket, its function will be to make possible coverage of that market niche and bring the number of Ford Motor Co. passenger car lines to five—the number Chrysler and General Motors offer.

Each division will grow in autonomy and responsibility. The ultimate objective is to have fully integrated units paralleling in general the GM scheme of things, with such modifications as seem best in the interests of efficiency. Each division ultimately will control its own manufacturing facilities within the dictates of efficiency. That indicates that although Ford already has committed itself to over $1.7 billion in expansion since the war, more will be coming.

Paring—While adding 28 manufacturing and assembly plants, 2 parts depots and 14 major engineering, research and office buildings, Ford has liquidated many properties not related directly to vehicle production. Included are small plants, plant sites, dwellings, stores, an inn, a golf course, plus timber, rubber, farm, commercial, industrial and residential lands throughout the world. Ranking among the 11 largest steel producers in the United States, Ford is nearing the end of an improvement program which has increased ingot capacity substantially.

It's hardly speculative to guess that Ford will offer stock to the public through the Ford Foundation this year for the first time. While this news is of primary interest to potential investors at the moment, the portent is the final tearing down of the walls of Jericho that have surrounded the company since its founding.

Plenty of Money—When the financial picture of the company is made public later this year, it probably will be clear that despite the continuing expansion ahead it will not need to sell stock to raise money. Depreciation reserves, plus a percentage of earnings, should provide sufficient capital to take Ford into competition across the board with General Motors. But should more capital prove necessary at some later date, the mechanism already will be in motion.

Ford's battle cry, "beat Chevrolet," will be changing shortly to "beat General Motors." With the present Ford Motor Co. only ten years old, it's not strange that the industry wonders what the kid will be like when he grows up.

Auto, Truck Output

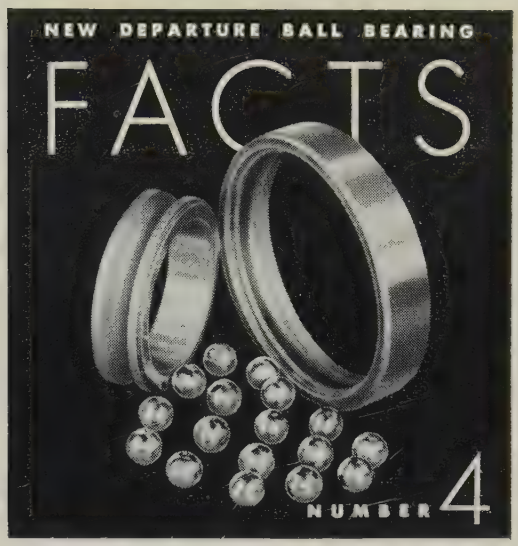
U. S. and Canada

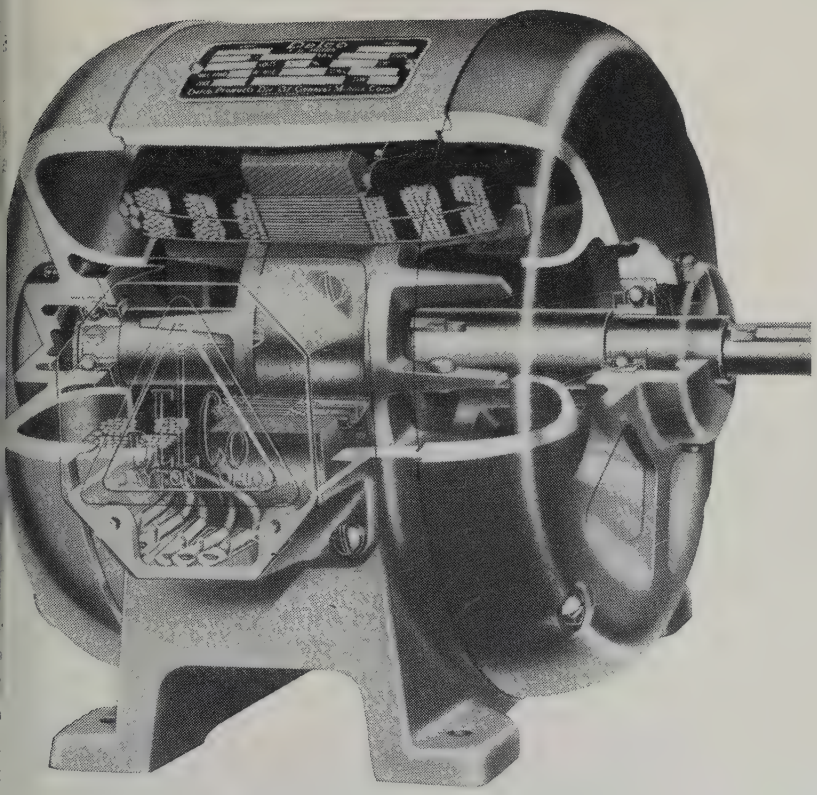
	1955	1954
January	780,780	594,467
February	770,528	574,215
March	955,014†	672,858
April	930,000*	676,248
May	.....	621,262
June	.....	623,732
July	.....	543,540
August	.....	523,799
September	.....	364,441
October	.....	312,078
November	.....	616,395
December	.....	761,954
Total	.....	6,884,989

Week Ended	1955	1954
Mar. 26	217,347	149,586
Apr. 2	218,437	146,498
Apr. 9	207,089	152,086
Apr. 16	218,078	148,559
Apr. 23	228,125†	157,710
Apr. 30	222,000*	159,206

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Answering the need for VERSATILITY in electric motors!





This Delco general-purpose, drip-proof motor is equipped with New Departure self-enclosed ball bearings. They not only assure permanently accurate support of the rotor shaft under all load conditions, but in normal operation they reduce bearing lubricating requirements to just about zero. However, should extra-severe conditions warrant it, the lubricant can be replenished quickly by removing the pipe plugs.

Note that the bearings have built-in seals on the inside faces, thereby preventing grease leakage into the motor, and the outer faces have metal shields which keep foreign matter out of the bearings. The shields do, however, permit entry of just the right amount of grease from the space in the end bell for perfect bearing operation, yet prevent excessive lubrication which could cause overheating.

End applications for modern electric motors are extremely varied. They may be mounted in positions from horizontal to vertical. Radial and thrust loads may be encountered in numerous combinations. Mounting locations may make periodic lubrication difficult or costly. Atmospheres may be charged with abrasive dust, or extreme cleanliness may be mandatory, with no lubricant leakage allowable.

All these conditions are directly related to the motor bearings—in fact *the versatility of a motor, or its ability to meet them, depends on the bearings used.*

BALL BEARINGS ARE THE ANSWER

Among the important features of the ball bearing are its ability to resist loads imposed from any direction and to locate rotating parts accurately and positively for many years of service. In electric motors accurate rotor-to-stator relationship is maintained regardless of mounting position, and bearings are cool-running at all speeds.

Lubrication factors are important too. Motors equipped with New Departure self-sealed or shielded bearings may be installed in difficult-to-reach places because the bearings will operate for years under normal conditions without attention for lubrication or adjustments of any kind.

With New Departure self-sealed, grease-lubricated ball bearings, lubricant leakage is no problem and the bearings are fully protected from abrasive dirt.

Just as New Departure has pioneered bearing developments which have added so greatly to the versatility of today's electric motors, so will New Departure be first with the bearing advances of tomorrow. New Departure, Division of General Motors Corporation, Bristol, Connecticut.

NEW DEPARTURE
BALL BEARINGS

NOTHING ROLLS LIKE A BALL

Use 52100 steel for parts like these:

1. Diesel injection pumps
2. Lathe centers
3. Slitting rolls and knives
4. Cam rollers for automotive steering gears
5. Machine tool parts
6. Pump parts
7. Aircraft engine parts
8. Mechanical seals
9. Saw mill rollers
10. Ball bearings
11. Asbestos disintegrators
12. Mill rolls

...and get all these advantages:

1. Hard
2. Tough
3. Machines easily
4. Exceptional wear-resistance
5. High tensile strength
6. Withstands working pressure of 200,000 p.s.i.

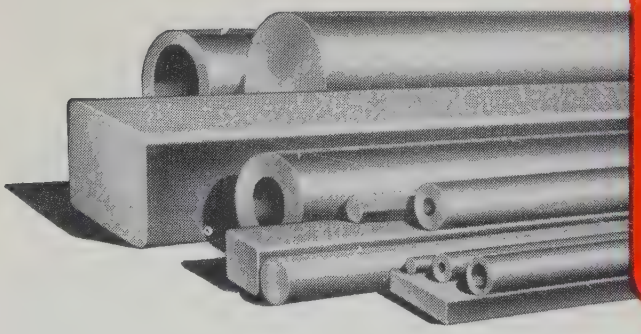
BECAUSE it's an alloy steel of high carbon analysis, Timken® 52100 has high tensile and fatigue strength. It's fully spheroidized structure makes machining easier. It has high hardenability throughout its cross section and can be oil quenched to a maximum hardness of 65/66 Rockwell C.

You can get 52100 steel from the Timken Company in all three finished forms: bars, tubes, wire. For your small run or emergency requirements, we maintain a mill stock of 101 sizes of 52100 tubing—from 1″ to 10½″ O.D. We can ship it in less-than-mill quantities within 24 hours after you order.

You're assured of uniform quality in every shipment because we control quality at every step in production. The Timken Company is one of the world's largest producers of 52100 steel, and America's pioneer producer of 52100 tubing.

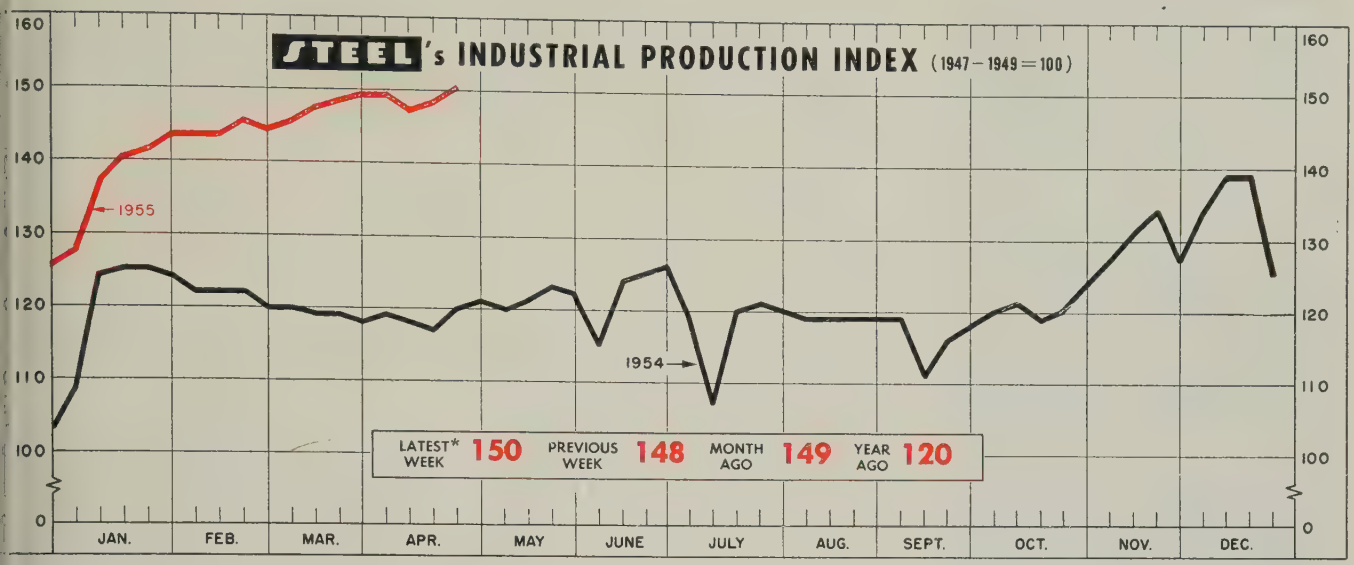
For a stock list of available sizes, grades and finishes, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
Fine Alloy
STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Apr. 23. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%.

Optimism Is Catching: Business Confidence Grows

TALK of a summer letdown in business is hardly audible. In its place is a new optimism akin to the hurly-burly of 1953.

The auto industry started the ball rolling last fall. Record construction and retail sales joined in to make a triple threat that turned recession to recovery; mild hopefulness to enthusiasm.

So What—Even the possibility of a serious auto strike isn't dampening the confidence with which most of industry is looking at 1955. A strike would hurt many businesses, but it isn't likely to make more than a minor dent in total 1955 business.

The breadth of the business upturn can be pieced together from comments coming out of annual meetings and first-quarter financial statements. Here's what a cross section of metalworking says:

Or Better — Reynolds Metals Co.'s net sales in the first quarter were up 33 per cent from a year ago; profits were up 63 per cent. "Business will be as good or better during the remainder of the year," predicts R. S. Reynolds Jr., president.

President John T. Whiting says Alan Wood Steel Co. is operating at capacity, and this high rate is expected to continue well into the third quarter. First-quarter net earnings were 46.5 per cent over the same period in 1954.

More Gains—Earnings at National Lead Co. were up 25 per cent over 1954's first quarter; sales were up 19 per cent, a first-quarter record, reports Joseph A. Martino, president. "Business is excellent in all the company's lines, with all divisions and branches substantially ahead of 1954. I am certain the balance of the year will show continued gains and should prove successful for National Lead Co., as well as for the nation as a whole."

International Nickel Co. of Canada had its best year in 1954; prospects for this year are "encouraging," says Dr. John F.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,316	2,284	1,637
Electric Power Distributed (million kw-hr)	9,575[1]	9,602	8,257
Bitum. Coal Output (1000 tons)	8,480	8,200	6,740
Petroleum Production (daily avg.—1000 bbl)	6,835[1]	6,828	6,586
Construction Volume (*ENR*—millions)	$382.8	$272.7	$248.0
Automobile, Truck Output (*Ward's*—units)	228,125	218,078	157,710
TRADE			
Freight Car Loadings (1000 cars)	685[1]	674	626
Business Failures (Dun & Bradstreet, no.)	200[1]	204	229
Currency in Circulation (millions)[3]	$29,714	$29,841	$29,673
Dept. Store Sales (changes from year ago)[3]	−13%	+8%	+12%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,977	$16,928	$17,977
Federal Gross Debt (billions)	$277.0	$277.0	$269.9
Bond Volume, NYSE (millions)	$23.7	$18.4	$17.4
Stocks Sales, NYSE (thousands of shares)	14,473	14,338	9,896
Loans and Investments (billions)[4]	$84.9	$85.1	$78.7
U. S. Govt. Obligations Held (billions)[4]	$34.1	$34.4	$31.3
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.74
STEEL's Nonferrous Metal Price Index[6]	237.3	237.1	213.9
All Commodities[7]	110.3	110.5	111.3
Commodities Other Than Farm & Foods[7]	115.8	115.7	114.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

LIFE STEPS UP AT 40!

1915 – 1955
FORTY DE·STA·CO QUALITY STAMPINGS YEARS

Sure we've been making stampings for 40 years! . . . But we're going *up* the hill faster than ever!

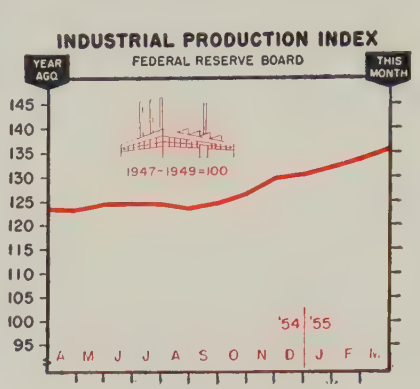
Expanded facilities! . . . Newer equipment! . . . Wider diversification! . . . Even more customers—and from every major industry!

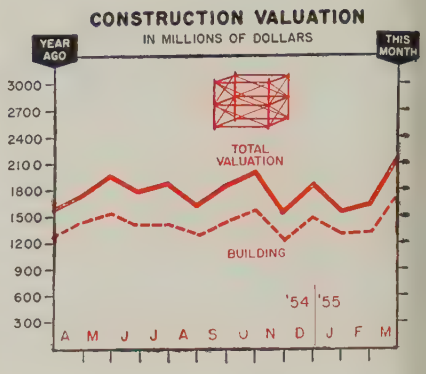
The mere fact that we're the nation's best-known job stamping manufacturer . . . shows how we've progressed.

Now . . . as our life *steps up* at 40 . . . would be a good time to let us do a bang-up job for you, too!

DETROIT STAMPING COMPANY
DE·STA·CO
359 Midland Ave., Detroit 3, Mich.
America's Best-Known Job Stamping Manufacturer

THE BUSINESS TREND





(seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1955	1954	1955	1954	1955	1954
Jan.	131	125	127	111	156	155
Feb.	133	124	131	108	157	152
Mar.	135*	123	136*	103	159*	148
Apr.	...	123	...	104	...	146
May	...	124	...	106	...	147
June	...	124	...	108	...	145
July	...	124	...	104	...	148
Aug.	...	123	...	105	...	148
Sept.	...	124	...	117	...	148
Oct.	...	126	...	110	...	149
Nov.	...	129	...	118	...	155
Dec.	...	130	...	120	...	156
Avg.	...	125	...	110	...	150

Federal Reserve Board. *Preliminary.
Charts Copyright 1955 STEEL.

37 States

	Total		Building	
	1955	1954	1955	1954
Jan.	1,504.5	1,151.9	1,255.1	935.6
Feb.	1,581.1	1,221.3	1,278.6	977.5
Mar.	2,134.8	1,527.5	1,748.6	1,199.8
Apr.	.....	1,691.9	.....	1,401.6
May	.....	1,925.3	.....	1,497.6
June	.....	1,733.3	.....	1,376.7
July	.....	1,836.9	.....	1,386.9
Aug.	.....	1,572.9	.....	1,243.3
Sept.	.....	1,816.2	.....	1,424.2
Oct.	.....	1,965.3	.....	1,522.8
Nov.	.....	1,498.9	.....	1,199.8
Dec.	.....	1,828.8	.....	1,463.0
Total	.....	19,770.2	.....	15,628.8

F. W. Dodge Corp.

Thompson, chairman. Capital expenditures of $22,257,000 last year were second highest for any year, and it is expected they will continue at a high rate for some time. "Those expenditures constitute investments made with the expectation of a satisfactory rate of return," Mr. Thompson notes.

Predict Better Earnings . . .

At American Steel Foundries, net income in the Mar. 31 quarter was 63 cents a share, compared with 17 cents the preceding quarter. It appears that earnings in the June 30 and Sept. 30 quarters will be larger because larger shipments are anticipated in most product lines, states Charles J. Jarchow, president.

"Barring unforeseen developments, 1955 should be one of U. S. Industries' better years in both sales and earnings, says John I. Snyder Jr., chairman and president. "We are reasonably sure we will top our original 1955 sales forecast of $80 million by a comfortable margin." First-quarter earnings were five times the 7 cents per common share of a year ago.

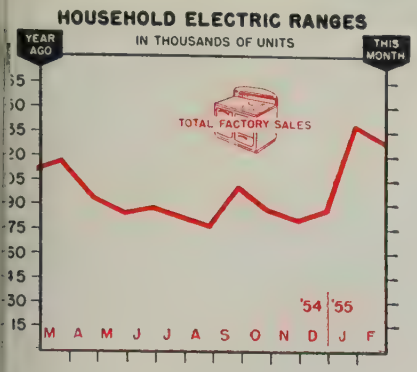
About Clearing Machine Corp., which U. S. Industries recently acquired, Mr. Snyder says: "There has been a definite upturn in incoming orders from both domestic and foreign customers. Outlook for the rest of the year, particularly in foreign markets, is good."

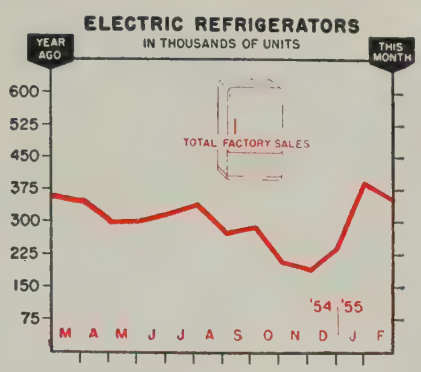
Capital Goods: Picking Up . . .

McKay Machine Co. had its biggest year in 1954. Business in 1955 is good, remarks Harvey D. Miller, president; and 1955 should be "profitable."

Business of another capital goods producer, Blaw-Knox Co., showed a pronounced improvement in March. W. Cordes Snyder, chairman and president, says commercial volume was highest for any month since 1953. "This improvement has continued in April and better operations and earnings already are being reflected." Prominent in the upturn were steel industry orders, a more than usual pickup in construction bookings and increased activity in the chemical processing market. "A generally firmer tone now is in evidence in all the company's sales lines," Mr. Snyder adds.

Appliances seem sure of another good year. John H. Ashbaugh, Westinghouse Electric Corp. vice president, reports: "Sales of (our)





	Total Factory Sales—Units		
	1955	1954	1953
Jan.	136,663	101,870	88,145
Feb.	127,188	109,647	114,465
Mar.	.....	115,393	130,788
Apr.	.....	92,751	118,999
May	.....	82,649	114,404
June	.....	85,854	113,086
July	.....	80,017	77,836
Aug.	.....	75,907	74,326
Sept.	.....	99,611	84,481
Oct.	.....	84,321	73,422
Nov.	.....	79,340	55,748
Dec.	.....	85,033	73,870
Total ...	.....	1,092,393	1,119,570

National Electrical Mfrs. Assn.

	Total Factory Sales—Units		
	1955	1954	1953
Jan.	381,197	344,401	325,186
Feb.	338,575	334,122	377,605
Mar.	.....	330,641	368,498
Apr.	.....	280,900	366,951
May	.....	282,164	317,667
June	.....	303,127	343,114
July	.....	325,061	298,838
Aug.	.....	256,665	232,981
Sept.	.....	271,859	231,224
Oct.	.....	190,753	179,749
Nov.	.....	175,557	139,563
Dec.	.....	228,612	197,102
Total	.....	3,323,562	3,378,478

National Electrical Mfrs. Assn.

electric appliances set a record during the first quarter of 1955. There is every indication of continued strength in appliance sales through the rest of the year—not only for Westinghouse but for the industry as well."

Elisha Gray II, president, Whirlpool Corp., remarks: "Second-quarter sales look promising. If anything, based on present orders, we should strengthen our sales position slightly."

Auto Suppliers Hopeful . . .

Auto suppliers have good prospects.

"Barring a major interruption of automotive production, the business outlook appears quite satisfactory," note F. C. Crawford, chairman, and J. D. Wright, president, Thompson Products Inc.

R. C. Ingersoll, president, Borg-Warner Corp., told stockholders: "Sales and earnings for the first quarter of 1955 were larger than those of any other quarter in your corporation's history. While we cannot expect our business volume to continue throughout the year at the first-quarter pace . . . every survey we have made points to the probability that in 1955 Borg-Warner will experience the greatest sales in its history and a satisfactory increase in income."

Eaton Mfg. Co.'s C. I. Ochs, chairman, says March shipments set a record; based on present indications and schedules, second-quarter operations will continue at a high rate.

Trends Fore and Aft . . .

Machine tool orders and shipments continued to rise in March; new orders were $63,350,000 vs. $50,150,000 a year ago . . . In the week ended Apr. 23, U. S. auto-truck output (215,265) set a record—5 per cent over the previous high . . . Heftier requirements of primary steel producers helped push January-March sales of Signode Steel Strapping Co. to their highest dollar volume for any quarter . . . American Supply & Machinery Manufacturers Association Inc. puts its March, new-order index at 186.88 (July, 1948 =100), up from February's 175.11 . . . Garrett Corp. will spend $5 million over the next two years for further modernization and expansion of facilities . . . Freight car deliveries rose for the second consecutive month in March; backlog, though, dropped from 18,663 to 17,974.

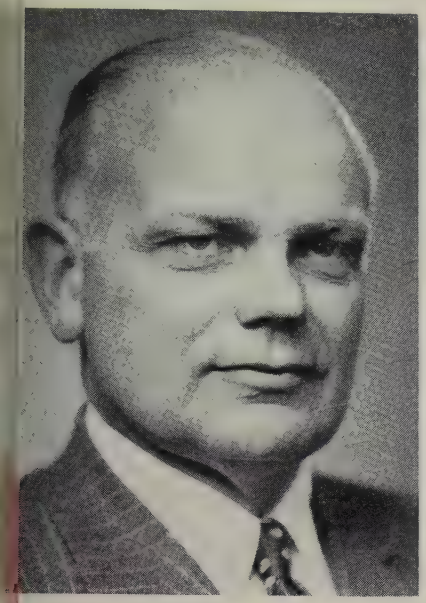
Choose from 11 types of Ohio Iron and Steel

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Holl-O-Cast Rolls
Chilled Iron Rolls
Denso Iron
Nickel Grain
Special Iron
Nioloy Rolls
Flintuff Rolls
Ohio Double-Pour Rolls

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

THE OHIO STEEL FOUNDRY CO.



LARS E. EKHOLM
. . . *Climax Molybdenum sales div. mgr.*

Lars E. Ekholm was made manager, sales division, **Climax Molybdenum Co.**, New York. He held several executive positions in the sales department, including direction of foreign sales, and has assisted in the development of market research, sales promotion and advertising programs.

W. J. Smetak was made executive vice president and treasurer of **W. J. Stamets Co.**, Pittsburgh, and its subsidiaries. **Henry R. Hanson** was made general sales manager, machine tool distributor division. Mr. Hanson is also a vice president of the company.

Walter A. Garrett was made sales manager of steel strapping for **Brainard Steel Division**, Sharon Steel Corp., Warren, O. He was eastern district manager at New York.

Ohio Seamless Tube Division, Copperweld Steel Co., Shelby, O. appointed **J. E. Horner** manager of sales; **J. J. Arntz** assistant sales manager; and **M. W. Freese** promotion and market development manager.

D. P. Cromwell, former manager of coke ovens and blast furnaces for Ford Motor Co., has become associated with **William M. Bailey Co.** as sales manager, Ohio district. He is at 342 Hager St., Hubbard, O.

ROBERT S. STEVENSON
. . . *president of Allis-Chalmers*

Robert S. Stevenson, executive vice president, was elected president of **Allis-Chalmers Mfg. Co.**, Milwaukee. He succeeds the late **William A. Roberts.** Mr. Stevenson also is a member of the executive committee of the board of directors.

Robert C. Overstreet was elected president, **Tinnerman Products Inc.**, Cleveland. He succeeds **George J. Schad**, retired. Mr. Overstreet has been executive vice president since 1953. **John E. Potter**, comptroller, was elected secretary-treasturer and a director.

ROBERT C. OVERSTREET
. . . *Tinnerman Products president*

H. L. CUMMINGS
. . . *R-P&C Valve gen. mgr.*

H. L. Cummings was made general manager, R-P&C Valve Division, **American Chain & Cable Co. Inc.**, Reading, Pa.

Norman J. Henke was elected vice president and plant manager of **Fanner Mfg. Co.**, Cleveland. He was in charge of chaplet and chill division sales for the last two years.

A. L. Davis was elected president and treasurer, **Pennsylvania Engineering Corp.**, New Castle, Pa. He succeeds **William S. Wheeler**, now chairman. **Clark Rossiter** was named executive vice president and general manager, and **P. M. Pattison** vice president and secretary.

Lincoln Electric Co., Cleveland, appointed **Norman J. Hoenie** chief engineer, machine division; and **Emmett Smith** chief engineer, electrode division.

Elmer W. Niskala was made general sales manager of **Borroughs Mfg. Co.**, Kalamazoo, Mich., subsidiary of American Metal Products Co.

Robert Lovell was made aircraft sales manager for **Townsend Co.**, New Brighton, Pa. He was executive vice president of Nylok Corp.

Harry J. Douglas was made manager, **Pennsylvania Crusher Division**, Bath Iron Works Corp., at West Chester, Pa. He succeeds

C. C. FULLER

H. O. EHRISMAN

. . . Foxboro sales management appointments

John A. Plimpton, resigned. **Lyle T. Johnston** was made sales manager.

C. C. Fuller was elected vice president to augment the sales management staff of **Foxboro Co.,** Foxboro, Mass. **H. O. Ehrisman** becomes general sales manager and **J. J. Burnett** field sales manager. **C. E. Sullivan,** vice president, retires from active sales direction to serve in a consulting capacity. A newly formed sales product development committee and a sales policy committee further co-ordinate the company's sales engineering and manufacturing functions. They are headed by Mr. Fuller and Mr. Ehrisman, respectively.

Chester Gainey is acting purchasing agent in charge of the purchasing department of **Eaton Mfg. Co.'s** Reliance Division at Massillon, O. **James Flood** was made plant metallurgist in charge of metallurgical and chemical activities for Plant No. 1 and Plant No. 2 at the division.

Roger W. Robinson was made sales manager for the transmission division of **Clark Equipment Co.,** Jackson, Mich.

Richard A. Geuder was made assistant general sales manager, **Reliance Electric & Engineering Co.,** Cleveland. **E. E. Helm,** sales vice president, was assigned added duties. He will co-ordinate the merging of the recently acquired Reeves Pulley Co. Division with other divisions of Reliance in Cleveland and Ashtabula, O. Reeves, at Columbus, Ind., continues as a division, with **Carl M. Reeves** as its president.

C. I. Wallace was appointed general sales manager, **Houdaille-Hershey of Indiana Inc.,** Lebanon, Ind., subsidiary of Houdaille-Hershey Corp. He was a member of the executive staff of the parent corporation at Detroit.

J. P. Henry was made general sales manager and **James A. Arter** vice president-manufacturing for **Ampco Metal Inc.,** Milwaukee. **R. J. Severson,** technical sales manager, succeeds Mr. Henry as assistant general sales manager.

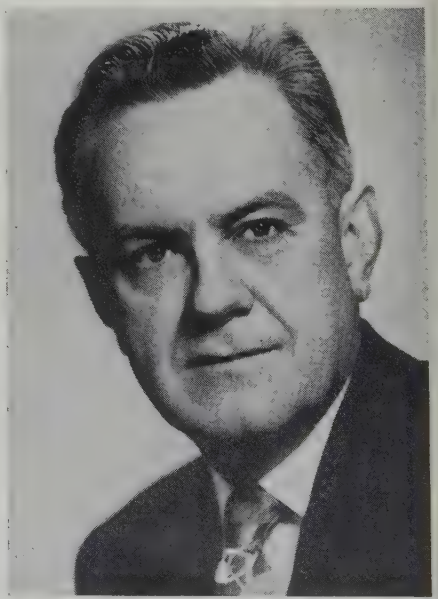
Louis Ellman was elected president of **M. H. Detrick Co.,** Chicago. He was vice president and district manager of the Pittsburgh office. Other appointments: **J. C. Wilson,** district manager of the Philadelphia office, elected vice president; **R. J. Stanley,** district manager of the Detroit office, also elected vice president; and **C. B. Edgar,** appointed Pittsburgh district manager.

William H. Sivy was made manager, manufacturing engineering department, at **Ford Motor Co.'s** tractor plant in Highland Park, Mich. Formerly supervisor, process and design section, Mr. Sivy succeeds **G. C. Joynt,** recently reassigned.

J. W. Robinson was made assistant general manager-sales at **Jones & Laughlin Steel Corp.'s** Gateway Center offices in Pittsburgh. **L. C. Berkey,** former district sales manager, Detroit, goes to Pittsburgh to direct a new corporation-wide program of purchasing-customer relations. **J. E. Pierce** succeeds Mr. Robinson as manager, hot-rolled products, and **Robert B. Algie** was made assistant manager. **D. T. Rogers** becomes manager, cold finished products.

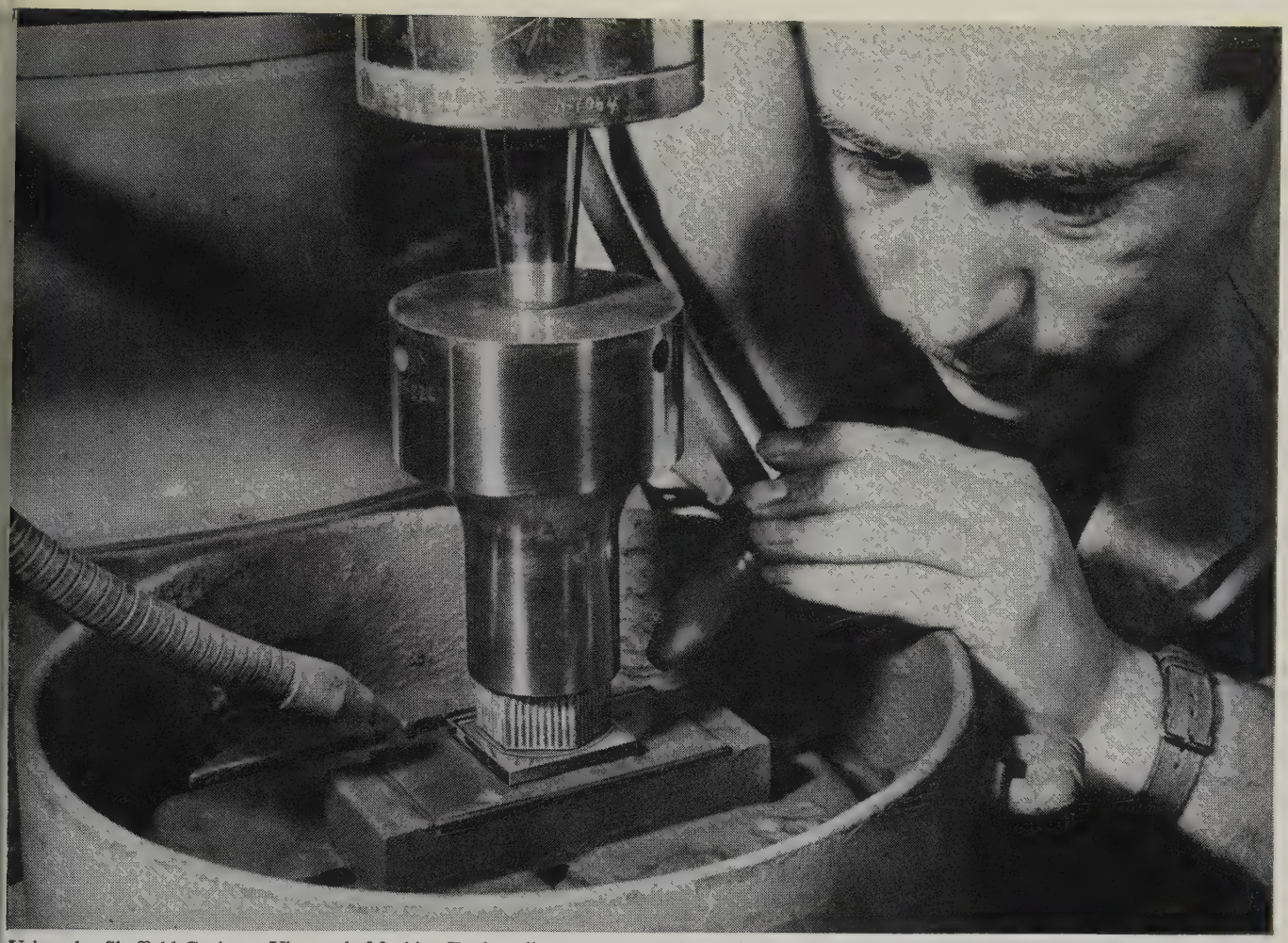
H. E. Swanson, recently retired from Bethlehem Pacific Coast Steel Corp.'s fabricating department, Seattle division, was named vice

J. P. HENRY



JAMES A. ARTER

. . . Ampco Metal gen. sales mgr. and v.p.-mfg.



Using the Sheffield-Cavitron Ultrasonic Machine Tool to dice germanium in the mass production of transistors. The tool itself consists of 271 pieces of Superior's 18-gage Type 304 needle tubing, cut to 7/8" lengths and silver brazed into a single tool, permitting tolerances as fine as .0005".

NEW ULTRASONIC MACHINE TOOL USES TUBING TO CUT HARDEST, MOST BRITTLE MATERIALS KNOWN

a new application for Superior Tubing

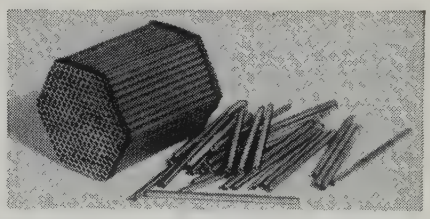
Ultrasonic vibrations do the cutting with this new machine tool, invented and developed by the Cavitron Equipment Corporation, Long Island City, N.Y. In the Cavitron process, a tool is used which has the precise shape of the cavity desired. Finely divided abrasive particles suspended in water are flowed continuously across the work. No movement or vibration is visible when the machine is switched on, although the tool tip vibrates 20,000 times a second through a stroke of .0035". The vibrating tip activates the suspended particles, and microscopic chips are gently excavated without heat, noise or vibration. The tool sinks swiftly into the work under slight pressure, forming a cut or cavity of exactly the same shape as the tip.

Tools made of Superior tubing save considerable cutting time on relatively large areas. Furthermore, the slender walls (.005" thick) minimize waste of valuable raw material. Cavitron engineers first used carbon tubing for this purpose, but in consultation with Superior engineers switched to AISI Type 304. This material has twice the life of carbon tubing, with much greater resistance to wear. Most important, it resists warping at the silver brazing temperatures needed to join the tubes together.

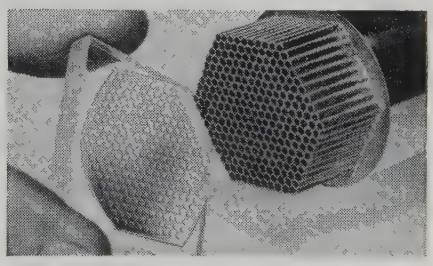
Your files should contain Superior Bulletin No. 40. It lists over 55 types of available material, including the stainless steels, with valuable selection and application data. Write for your free copy today. SUPERIOR TUBE COMPANY, 2005 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Co., 5710 Smithway St., Los Angeles 22, California.

All analyses available in .010" to 5/8" OD; certain analyses in light walls up to 2 1/2" OD

Superior Tube
The big name in small tubing



Superior tubes are cut into 2" lengths and silver brazed into a 6-sided tool, which is then cut in half and two complete honeycomblike tools formed—each 7/8" deep. Similar tools are used to cut precision jewel bearings.



Closeup of tool and work shown in top picture. The Cavitron makes it possible to cut and drill intricate shapes in materials which, because of their frangibility or sensitivity to sudden temperature changes, would be impossible to work on a production basis.

GEORGE M. CLASS

FREDERICK L. CHAPMAN

. . . vice presidents of Gisholt Machine Co.

president of **Isaacson Iron Works,** Seattle, with which he was formerly associated.

Gisholt Machine Co., Madison, Wis., elected **George M. Class** and **Frederick L. Chapman** vice presidents. Mr. Class was formerly in engineering, Mr. Chapman in sales. Mr. Chapman also was elected a director to succeed **Claude K. Swafford,** retired.

At **General Motors Corp.'s** central foundry division, Saginaw, Mich., **Elmer E. Braun** was made divisional production manager. Other appointments: **Carl A. Koerner,** divisional manufacturing manager; **F. James McDonald,** plant manager of the Defiance, O., plant; **Charles E. Drury,** factory manager, Saginaw malleable iron plant; **T. E. Smith III,** factory manager, Danville, Ill., plant.

G. H. Schryver was appointed materials handling engineer, **Wheeling Steel Corp.,** Wheeling, W. Va. He was assistant general manager of the Martins Ferry, O., factory, and was replaced by **Chandler G. Lewis.**

H. M. Thomas was made general superintendent of U. S. Steel Corp.'s **Consolidated Western Steel Division's** pipe mill near Provo, Utah. It's scheduled to get into production shortly.

Robert E. Navin joined **Hays Corp.,** Michigan City, Ind., as assistant to the executive vice president, concerned primarily with engineering activities. He was with Detroit Bevel Gear Co.

Myles C. McGough was elected a vice president of **Merritt-Chapman & Scott Corp.,** New York, in charge of the industrial and building construction department.

The new executive staff at **Gabriel Co.,** Cleveland, has three vice presidents. Heading sales and advertising for all divisions is **L. W. Klein. Pat Leone** heads operations for all divisions, including manufacturing, engineering, purchasing and personnel. **A. P. McDiarmid** is responsible for financial operations of Gabriel and its subsidiaries.

Dr. William A. Johnson, former director, metallurgy division, at the Atomic Energy Commission's Oak Ridge National Laboratory, will head a new chemical and metallurgical laboratory to be erected (starting this fall) at the Tapco plant of **Thompson Products Co.,** Cleveland.

In the quality control department of **Weirton Steel Co.,** Weirton, W. Va., division of National Steel Corp., **S. J. Dougherty** was named assistant chief metallurgist in charge of metallurgical work in the strip mills and steel works; and **H. F. Leuthke** was named assistant chief metallurgist in charge of metallurgical work in the tin mills and sheet mill.

Aircraft Products Division, Aro Equipment Corp., Bryan, O., promoted **R. B. Blythe** to assistant to the vice president, and **D. W. Orrick** to sales manager of aircraft products.

Glenn W. Graf was made sales promotion manager of Westinghouse Air Brake Co.'s **Le Roi Division,** Milwaukee.

Dr. Myles L. Mace, professor at the Harvard University Graduate School of Business Administration, was elected vice president of **Litton Industries,** Beverly Hills, Calif., an electronics firm.

James C. Kyle was named technical director, transducer division, **Consolidated Engineering Corp.,** Pasadena, Calif.

Chester W. MacArthur was made manager of the Washington office of **Continental Can Co.** He replaces the late **W. L. Rowlands.**

OBITUARIES . . .

K. C. Gardner Sr., 78, chairman of **United Engineering & Foundry Co.,** Pittsburgh, and its chief executive officer, died Apr. 15.

Edmund F. Barkow, 72, former vice president and director, **Wisconsin Bridge & Iron Co.,** Milwaukee, died Apr. 17. He had been serving in an advisory and consulting capacity since retiring two years ago.

A. Warren Wheaton, 69, founder and chairman of **Wheaton Brass Works,** Union, N. J., died Apr. 19.

Walter H. Gardner, 67, retired general sales manager, **Keystone Steel & Wire Co.,** Peoria, Ill., died Apr. 20.

Henry Thorkildsen, 63, director of purchases, **Wisconsin Motor Corp.,** Milwaukee, died Apr. 17.

John M. Cook, 60, a vice president and director of **Behr-Manning Corp.,** Troy, N. Y. died Apr. 14.

George B. Bassett, 93, founder of **Buffalo Meter Co.,** Buffalo, died Apr. 14. He retired in 1945.

round the clock with CF&I-WICKWIRE WIRE

Let's take a look at a typical day in the life of John Q. Citizen and of the part CF&I-Wickwire Wire plays in his everyday activities.

7:00 A.M.—BEDROOM. John's day starts with the ringing of his alarm clock. There's wire in the mattress and bedspring. In the lampshades and drapery hooks. Bobby pins, safety and common pins in his wife's dressing table—to mention just a few.

7:15 A.M.—NURSERY. Here's the crib from which young John helps the alarm clock to rouse his dad. No less than nine different kinds of wire go into its making. His toys and his tricycle, too—even the zippers on his clothes make use of CF&I-Wickwire Wire.

7:30 A.M.—KITCHEN. Let's inspect the kitchen. In the range and the refrigerator there are wire racks. The kitchen utensils, wire strainers, electric mixer, the egg slicer, the toaster, and dozens of other appliances all use CF&I-Wickwire Wire in their construction.

FOR THE WIRE YOU REQUIRE
CHECK CF&I-WICKWIRE

Watch for the balance of John's day in succeeding advertisements that take him to his office, through his plant and finally home to his living room.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

2846

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia • THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Wichita

TO Improve Quality

PARAGON SPRING CO.

USES A

HEVI DUTY

SHAKER HEARTH FURNACE

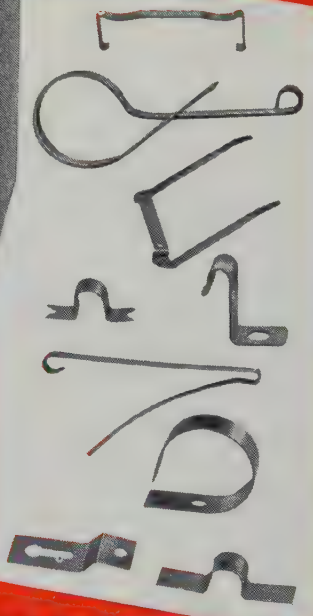
With Amazing Results

Here's what Ed. Stanek says . . .

Ed. Stanek, Heat Treating Superintendent says, "We sure were amazed at the improved quality of our springs. With our new Hevi Duty Shaker Hearth Furnace, we get clean scale-free parts that do not require pickling or sandblasting before plating. In addition to that, we get a better, cleaner plating job than before. The parts retain their carbon and are less subject to hydrogen embrittlement. Now, heat treating takes less time and rejections have been practically eliminated. Our customers are really getting fine quality springs."

UNIFORM CASE DEPTH

This Hevi Duty Shaker Hearth Furnace is fully adjustable to give complete control of heat treating processes such as Hardening, Dry Cyaniding and Carburizing. Write for Bulletin HD-850 describing the furnace that assures uniform results on a production basis.



TYPICAL PARTS

These are a few of the springs treated at Paragon Spring Company, Chicago, Illinois. They are different in size but results are consistently uniform.

HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers ***Constant Current Regulators***

Norton Expands in West

Equips plant in Santa Clara, Calif., for manufacture of grinding wheels

NORTON CO., Worcester, Mass., is equipping a plant for the manufacture of grinding wheels at 2555 Lafayette St., Santa Clara, Calif. Starting late this year, it will manufacture a full line of vitrified, organic and diamond wheels.

Renovating and equipping the plant, purchased last fall, will cost about $1 million. Much of the equipment is being purchased or specially built by Norton.

Management—George A. Garrison, formerly superintendent of packing and shipping at the Worcester plant, has been named manager of the west coast facility. Other appointments: L. G. Jacobson, office manager; F. G. Bevis, accountant; Duane Barnhart, control engineer; F. H. Mattson, foreman of mixing, molding and firing; M. T. Johnson, foreman of finishing operations, packing and shipping.

In addition to abrasive products, Norton makes precision grinding and lapping machinery; high-temperature refractory products; wear-resistant products; pulpstones and nonslip flooring material.

It maintains mines at Bauxite, Ark.; electric furnace plants at Chippawa, Ont., and Cap-de-la-Madeleine, Que.; manufacturing plants in Canada, Ireland, England, Germany, France, Italy, South Africa and Australia.

Its Behr-Manning Division makes coated abrasive products and pressure sensitive tapes at Troy, N. Y. Oilstones and sharpening specialties are made by the Norton-Pike Co., Littleton, N. H. Another electric furnace plant is under construction at Huntsville, Ala. Production is expected to begin there about the first of the year.

Heavy Press Starts Operations

Wyman-Gordon Co., Worcester, Mass., opened an office at 3670 Wilshire Blvd., Los Angeles. The company, specializing in large, light-metal forgings, started making aluminum forgings for the aircraft industry on a 35,000-ton press on Mar. 7 in North Grafton, Mass. This press is part of the Air Force

with STANLEY®

STEEL STRAPPING

The circular washfountain bowl being packed for shipment above weighs about 800 pounds, ***but it has to be protected every mile of the way to its destination!***

That's why the Bradley Washfountain Company, Milwaukee, Wisconsin, manufacturers of washfountains for washrooms and locker rooms, puts 4 bands of positive protection — ¾" Stanley Steel Strapping — around each crated washstand they ship. They find this the easiest, most economical and best way to get their product safely to its destination.

The pedestals (in crates at right) get the same careful handling, with Stanley Steel Strapping applied to assure damage-free delivery.

You can find out how Stanley can protect ***your*** product, whether you ship it across town, across the nation, or across the ocean. Without cost, you can have the Stanley Steel Strapping Specialist call to analyze your packing problem and suggest a solution that will give you better protection at lower cost.

Stanley has the right steel strapping hand or power tool to pack any product — of any size, weight, shape or material — easier, faster, safer. Mail coupon for descriptive catalog.

STANLEY INSURE IT — SECURE IT WITH STANLEY STEEL STRAPPING

STEEL STRAPPING DIVISION

THE STANLEY WORKS

STANLEY STEEL STRAPPING DIVISION, 1055-S LAKE ST., NEW BRITAIN, CONN.

Telephone: BAldwin 9-2021

☐ *Please send Catalog SS-9C.* ☐ *Please have Representative call.*

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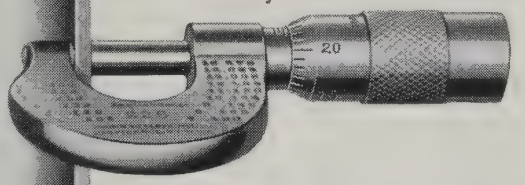
Stanley Tools • Stanley Hardware • Stanley Electric Tools • Stanley Steel Strapping • Stanley Steel

Proved Under PUNISHMENT

STANDARD CYLINDER TUBING

"Mirror Finished" to precision tolerances, it's used in automobile shock absorbers, power steering, hydraulic pumps . . . without further sizing or finishing.

Here's a busy part of an automobile shock absorber that's built for brutal punishment. It's Standard's modern "mirror-finish" Cylinder Tube. So that it won't weaken or leak under punishment, every inch of this tubular "toughie" must measure up to exacting specifications—in cylinder finish . . . in I.D. tolerances as close as .001" . . . in extreme uniformity of wall thickness and concentricity . . . in internal pressure resistance, to shocks up to 9000 P.S.I. The elimination of broaching or further processing of any kind effect significant savings for our customers in product assembly.



As you see here, the engineering involved behind the application of tubing to your product is *more than skin deep at Standard.* Our engineers will gladly show you why in helping you with your tubular application—whether it involves a simple structural or mechanical member . . . or a precision application.

Send for 8-page folder on all Standard products or see Sweet's Design Catalog.

MAKE "STANDARD" YOUR SOURCE FOR—

- WELDED MECHANICAL TUBING
- WELDED STAINLESS TUBING
- BOILER AND HEAT EXCHANGER TUBING
- EXCLUSIVE "RIGIDIZED" PATTERNS

STEEL TUBING SIZES: ½" O. D. TO 5½" O. D. — .028 TO .260 WALL.
STAINLESS SIZES: ¼" O. D. TO 4½" O. D. — .020 TO .154 WALL.

Heavy Press Program. Another unit, with a 50,000-ton capacity, at North Grafton, will go into production this summer.

Arcadia Metal Builds Plant

Arcadia Metal Products Co. is erecting a 50,000-sq-ft, $500,000 plant at Fullerton, Calif.

Time Saver

A NEW PRACTICE makes it possible to erect an industrial furnace in a week or less. The job usually takes from six to eight weeks.

The procedure was adopted by Surface Combustion Corp., Toledo, O. Caterpillar Tractor Co. did not want the confusion and inconvenience of building a large, heat-treat furnace in the middle of its production operations.

The furnace, 70 ft long and weighing about 70 tons, was shipped from Surface Combustion's Toledo plant completely assembled and ready for installation at Caterpillar's Peoria, Ill., plant. Conventional practice is to fabricate parts in the builder's plant and ship them, together with refractories, piping and other materials, to the customer's plant for erection.

Worthington Forms Division

Worthington Corp., Harrison, N. J., is merging its Wellsville Works with its Steam Turbine Sales Division. General manager of the Steam Turbine Division is A. F. Reinking. Paul R. Darling is manager of steam turbine sales; L. E. Hammer, manager of manufacturing.

Columbian Vise Expands Plant

Columbian Vise & Mfg. Co. is expanding its vise manufacturing facilities with a 10,000-sq-ft addition to its Cleveland plant. Levels are produced at Newton Falls, O.

EASIER OPERATION
FASTER PRODUCTION

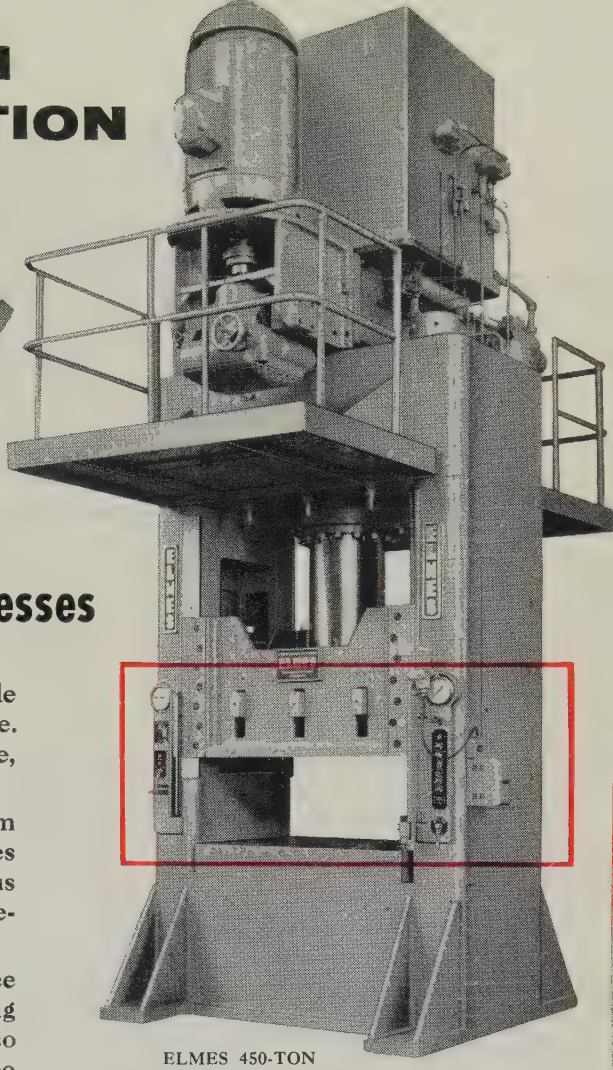
..are under your thumb!

with the sensitive, floor-level *Control System* on ELMES Presses

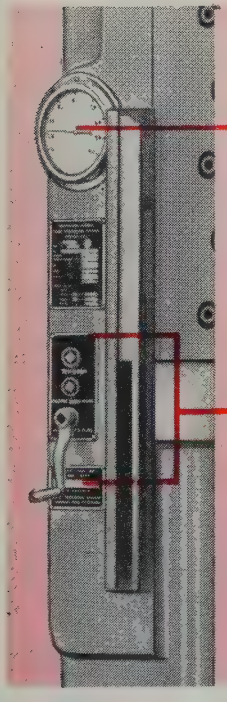
Elmes simplified controls—all at floor level—have made hydraulic press operation fast, accurate, instantly responsive. Operators of Elmes® Presses have *confidence* in the precise, unfailing control at their command.

Illustrated and described below is the Elmes control system for single-action presses. (Note especially those features which are *exclusively* Elmes.) These same controls, plus additional control features, are provided on Elmes double-action presses.

Elmes engineers have the long and specialized experience that is all-essential for helping you solve your metal-pressing problems to the *best* advantage. And they're ready to do so at all times. For recommendations and cost estimates, see your Elmes Distributor, or write to us direct.



ELMES 450-TON
SINGLE-ACTION DRAWING
AND FORMING PRESS



Left-Hand Control Panel

Oil temperature signal and cut-out. Cut-out is set to stop motor automatically if oil temperature should rise above recommended safe operating level.

Stroke control and speed change adjustments controlled from front of press (EXCLUSIVE). This feature permits operator to make adjustments while press is in action and to observe position of the ram while making adjustments.

Right-Hand Control Panel

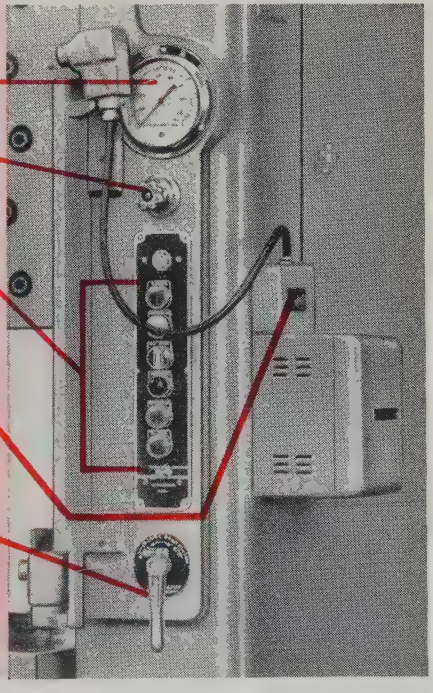
Pressure gauge.

Pressure reversal control.

Pushbuttons for starting, stopping, and reversing press, and selector switch for jog and semi-automatic operation.

Electric eye safety stop control (optional feature).

Manual, hydraulic bleed-off type inching control for die setting (EXCLUSIVE). This feature permits control of slide movement to within a few thousandths of an inch.



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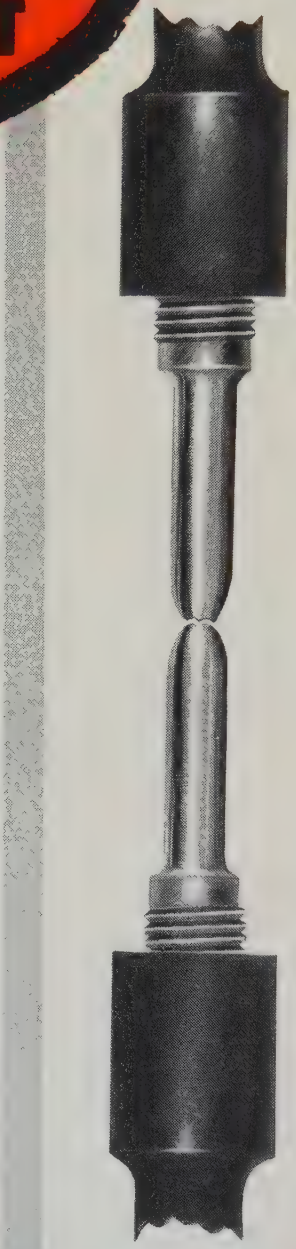
AMERICAN STEEL FOUNDRIES • ELMES ENGINEERING DIVISION
1175 Tennessee Avenue...Cincinnati 29, Ohio

HYDRAULIC PRESSES & EQUIPMENT

METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS

INSIDE STORY

AUSTENAL SILENT TREATMENT



This is the inside of a creep rupture machine at Austenal Laboratories. A bar of ultra-strong alloy is subjected to high stress for many hours at jet engine temperatures until it finally ruptures.

The drawing symbolizes determination of rupture strength of an alloy to be used in Austenal's Microcast process for the investment casting of high temperature components for jet engines. This is one of many laboratory tests used to ensure the quality and dependability of the alloys used.

The alloy was made in Austenal's own alloy plant. Skilled metallurgists and chemists produce alloys to pre-determined specifications and check and re-check each individual melt to ensure high quality standards.

Quality control is basic in Austenal's Microcast process. It is just one of the reasons why more jet engines use Austenal components than any other—and why American industry depends upon Austenal.

Let Austenal help solve *your* precision casting problems. Austenal Microcast can simplify and improve your entire production picture.

See Austenal's original informative 16mm color movie, "A Story of Industrial Progress". Available without charge.

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LABORATORIES, INC.

microcast division

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7001 SO. CHICAGO AVE. • CHICAGO 37, ILL.

Axelson Enters New Field

Los Angeles firm buys Fray line of milling machines and milling attachments

AXELSON MFG. CO., Los Angeles, has entered the milling machine field. The firm, a division of U. S. Industries Inc., purchased the line of milling machines and attachments made by Fray Machine Tool Co., Burbank, Calif.

Milling machines will be manufactured in the plant that has turned out Axelson heavy-duty lathes and special machine tools since 1915. They are designed for use in all types of metalworking plants. Milling attachments can be used on machine tools other than milling machines, such as planers, engine lathes and boring mills. They may be used, say company officials, to build up special machine tools, such as one that performs a series of machining operations at "all angles" to a workpiece without making changes in setup.

Hyde Spring Builds in Canada

Hyde Spring & Wire Co., Detroit, purchased a site near Brantford, Ont., for the erection of a $300,000 plant for manufacture of heavy-duty coil springs.

Ferroxcube Changes Hands

Indiana Steel Products Co., Valparaiso, Ind., manufacturer of permanent magnets, acquired Ferroxcube Corp. of America, Saugerties, N. Y., producer of ferrites and Magnadur ceramic magnets.

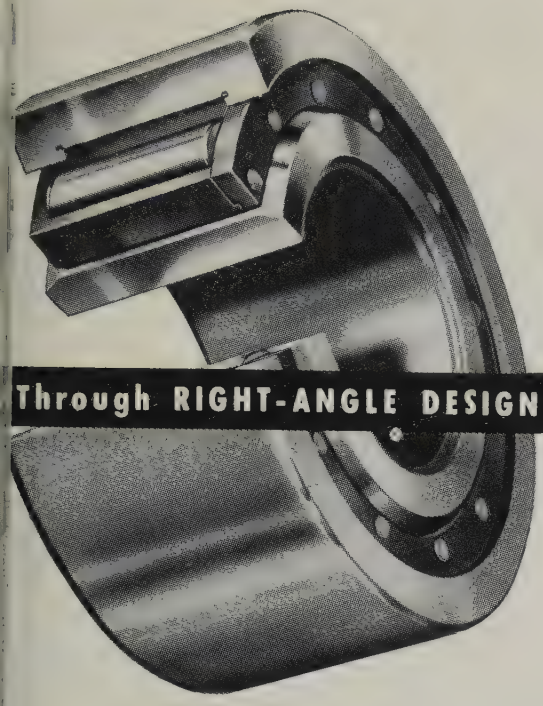
Canadian Firm To Expand

B. Greening Wire Co. Ltd., Hamilton, Ont., purchased a site near Orangeville, Ont., on which it will erect a $125,000 plant for the manufacture of wire screen and similar products.

Sets Up Direct Sales Outlet

Townsend Co., New Brighton, Pa., manufacturer of cold-formed fasteners and special parts, set up direct factory sales representation in the New York metropolitan area. Sales will be under the jurisdiction of F. L. Brierly, eastern di-

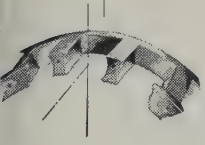
Truer Rolling AND Longer Life...



Through RIGHT-ANGLE DESIGN.....

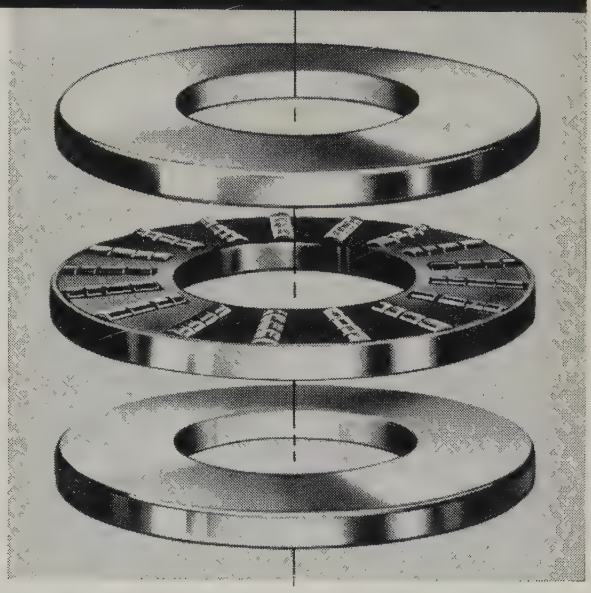
RIGHT-ANGLE
Roller Ends, precisely square to avoid end-rub, oscillation and side-shock.

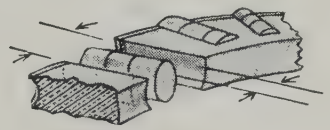
RIGHT-ANGLE
Bearing Surfaces with parallelism that results in unwavering right-line rolling.



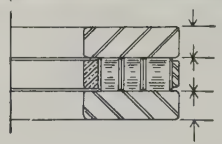
RIGHT-ANGLE
Separator Slots accurately machined to prevent roller skew, slide and uneven wear.

Through PRECISION-PARALLELISM





PRECISION-PARALLELISM
between rollers and matched thrust plates to preserve maximum capacity and eliminate Brinell effect.



PRECISION-PARALLELISM
between rollers and machined separator slots to assure perfect alignments; minimize sliding friction and wear.

ROLLWAY Radial and Thrust Cylindrical Roller Bearings

The advantages of Rollway's *right-angle design* and *precision parallelism* are readily apparent: Rubbing or sliding friction is negligible. Roller end-wear is practically nil. Starting torque is lower. Bearing life is extended. Shut-downs for bearing maintenance and replacement are fewer and farther apart.

Rollway's complete engineering and metallurgical services will gladly work with you on your problems. Simply write or wire any office. No cost. No obligation.

Rollway Bearing replacements are available through authorized distributors in principal cities. Consult your classified phone directory.

Rollway Bearing Company, Inc., Syracuse 4, N.Y.

ROLLWAY
BEARINGS
COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

CHEMICAL USERS' GUIDE To General Chemical Products for the Metal Industries

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTHS	SHIPPING CONTAINERS	APPLICATIONS
Sulfuric Acid H_2SO_4	Liquid	66° Be (93.19%) 99% Oleum, 20-65%	Carboys (except Oleum) Steel Drums Tank Trucks Tank Transports Tank Cars	Pickling and descaling; electroplating; bright dipping; electrolytic polishing; galvanizing; anodizing.
Hydrochloric Acid HCl + water *(Muriatic Acid)*	Liquid	18° Be (27.92%) 20° Be (31.45%) 22° Be (35.21%)	Carboys Tank Trucks Tank Cars	Pickling; electroplating; bright dipping; galvanizing; tinning; etching metals; dissolving metals.
Nitric Acid HNO_3 + water	Liquid	36° Be (52.30%) 38° Be (56.52%) 40° Be (61.38%) 42° Be (67.18%) 95%	Carboys (except 95%) Drums Tank Cars	Pickling; electroplating; bright dipping; oxide finishing; dissolving and stripping metals.
Hydrofluoric Acid HF + water	Liquid	60% 70%	Steel Drums & Tank Cars	Pickling; electroplating; electrolytic polishing; bright dipping.
Sodium Fluoride NaF	White Powder	95% or 97% Light or Dense	Multiwall Paper Bags Fibre Drums	Manufacture of rimmed steel; heat treating; galvanizing; pickling; electroplating.
Sodium Bifluoride $NaHF_2$	White Powder	95% or 97% NaF • HF	Fibre Drums	Electroplating.
Trisodium Phosphate $Na_3PO_4 \cdot 12H_2O$ *(TSP)*	Crystal	P_2O_5—18.4%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Sodium Metasilicate $Na_2SiO_3 \cdot 5H_2O$	White Granules	98.5%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Oxalic Acid $C_2H_2O_4 \cdot 2H_2O$	Colorless Crystals	99.5%	Multiwall Paper Bags Fibre Drums	Oxide finishing; metal cleaning.
Potassium Fluoborate KBF_4	White Powder	97.0%	Fibre Drums	Aluminum and magnesium casting; as a flux and grain refiner for aluminum; for removing magnesium from secondary aluminum alloys.
Sodium Fluoborate $NaBF_4$	White Powder	94.0%	Fibre Drums	
Ammonium Fluoborate NH_4BF_4	White Powder	96.0%	Fibre Drums	Aluminum and magnesium casting; electroplating.
Fluoboric Acid HBF_4 + water	Liquid	42.0%	Rubber Drums	Electroplating; metal cleaning or dipping; electropolishing.
Lead Fluoborate $Pb(BF_4)_2$ + water	Liquid	51.0%	Carboys	Electroplating.
Tin Fluoborate $Sn(BF_4)_2$ + water	Liquid	47.0%	Carboys	Electroplating.
Copper Fluoborate $Cu(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Iron Fluoborate $Fe(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Nickel Fluoborate $Ni(BF_4)_2$ + water	Liquid	42%	Carboys	Electroplating.

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.

OTHER PRODUCTS: Acetic Acid; Ammonium Thiosulfate Solution; Aqua Ammonia; Barium Fluoride; Chromium Fluoride; Copper Fluoride; Copper Sulfate; Glauber's Salt; Iron Sulfide; Nickel Fluoride; Perchloric Acid; Sodium Bisulfite, Anhydrous; Sodium Silicate; Sodium Sulfite, Anhydrous; Stannous Chloride; Tetrasodium Pyrophosphate; Phosphoric Acid; Sodium Tripolyphosphate.

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In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

Allied Chemical

sion sales manager, with headquarters in Philadelphia. The Philadelphia office will have a New York telephone number to facilitate contact with customers in the New York area.

Electronic Firms Merge

Electronic Specialty Co., Los Angeles, acquired controlling interest in Electromec Inc., Burbank, Calif., manufacturer of electronic and electromechanical units. Electromec will be operated as an affiliate.

Aeroquip Buys West-Coast Firm

Aeroquip Corp., Jackson, Mich., acquired Marman Products Inc., Los Angeles, manufacturer of pipe clamps, flex joints and valves. Aeroquip makes flexible hose lines.

Peerless Electric Expanding

Peerless Electric Co., Warren, O., is expanding its plant for the manufacture of small electric motors. A $500,000-expansion program includes a $350,000 building with 54,000 sq ft of floor space. It will house the Fan & Blower Division.

Lobdell Becomes Division

Lobdell United Co. is no longer operating as a subsidiary of United Engineering & Foundry Co., Wilmington, Del. It is now a division of the parent company under the name, Lobdell United Division.

Winder To Build in Georgia

Winder Aircraft Corp., Winder, Ga., plans to build a plant at Tifton, Ga., to manufacture electronic equipment. The Electronics Division is manufacturing products for the government and commercial users.

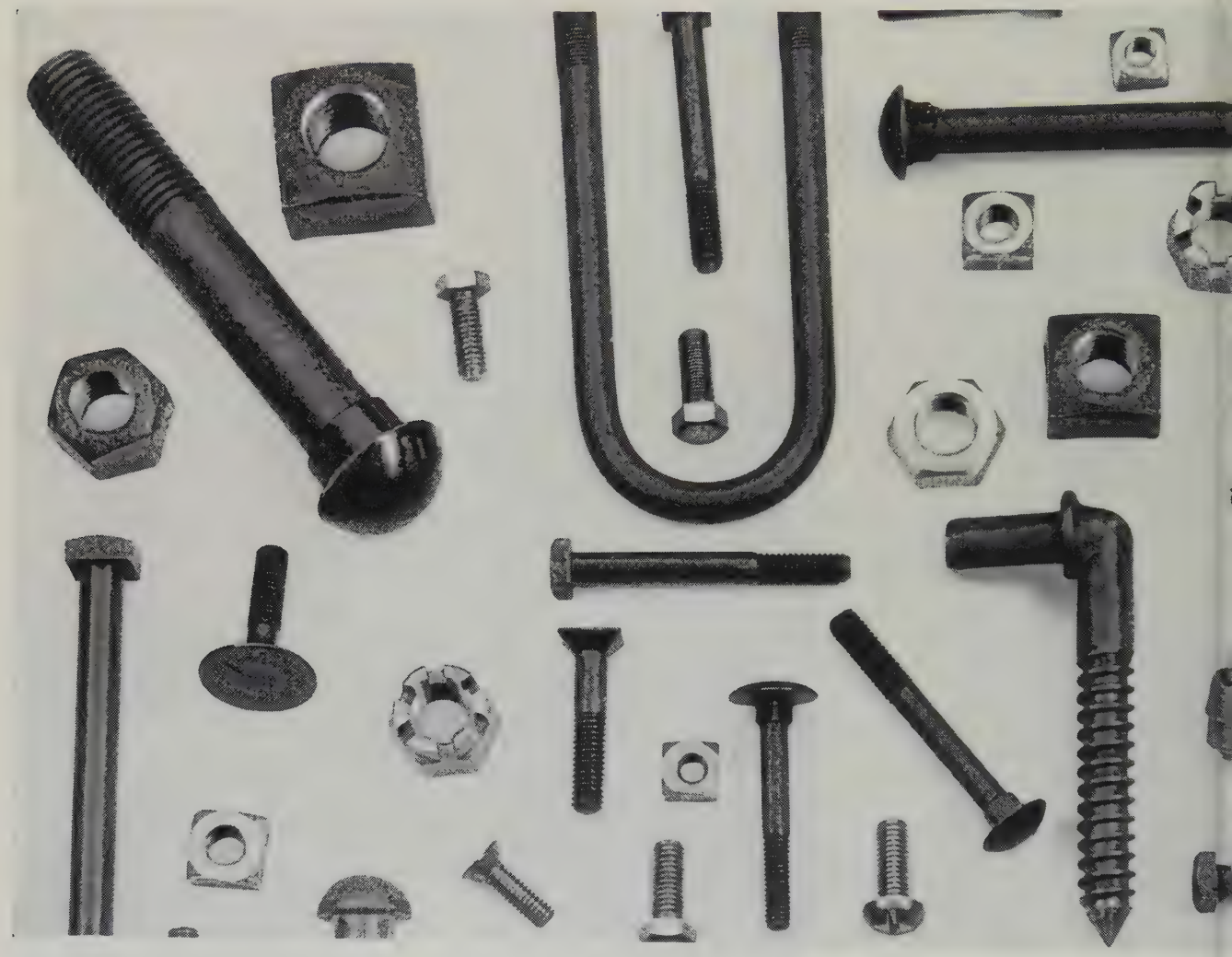
Stokes Opens Sales Office

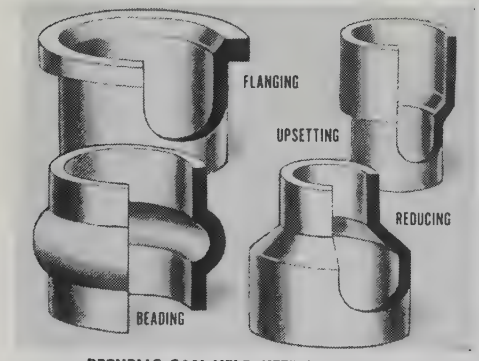
F. J. Stokes Machine Co., Philadelphia, opened a New York district sales office at 26 E. First St., Mt. Vernon, N. Y. District manager is J. C. Coleman. A branch office was opened at 2165 Morris Ave., Union, N. J., with R.

(*Please turn to page* 100)

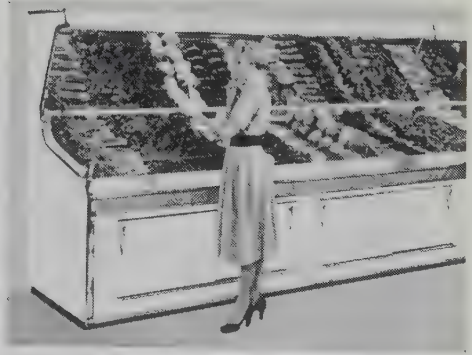
SELECT THE FASTENERS

...from more than 20,000 types and sizes

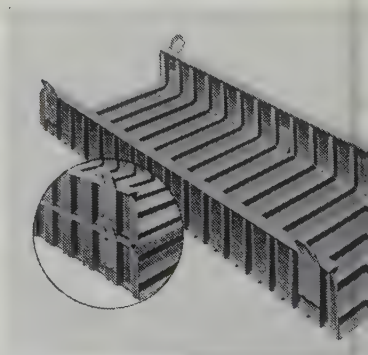




REPUBLIC CAN HELP KEEP YOUR TUBE FABRICATING COSTS DOWN. Operations shown above are only a few of the many Republic's Steel and Tubes Division can perform. Republic can prefabricate your individual parts or complete assemblies from either carbon or stainless steel tubing. You save the cost of new equipment and valuable plant space. And you get a precision job on a production basis.



REPUBLIC ENDURO STAINLESS STEEL TRIMS COSTS for manufacturer of commercial refrigeration cabinets. C. V. Hill Co. eliminated a burnishing operation and saved 3 cents a foot when they switched to ENDURO strip, No. 2 finish, for cabinet trim. There's no surface to flake or peel. Nothing to tarnish. ENDURO is solid stainless steel. Republic makes ENDURO in all commercial forms and finishes and will show you how to use it to best advantage in your product or process.



REPUBLIC BAR CARRIER SIMPLIFIES HANDLING of bars, pipe, tubing or other ma terials with lengths longer than the carrier This P-135 Unit is equipped with liftin lugs for crane handling and can be tiered t any practical height. Open-end design per mits easy removal of material from any uni in the tier. This is one item in the complete lin of Republic Materials Handling Equipment

YOU NEED

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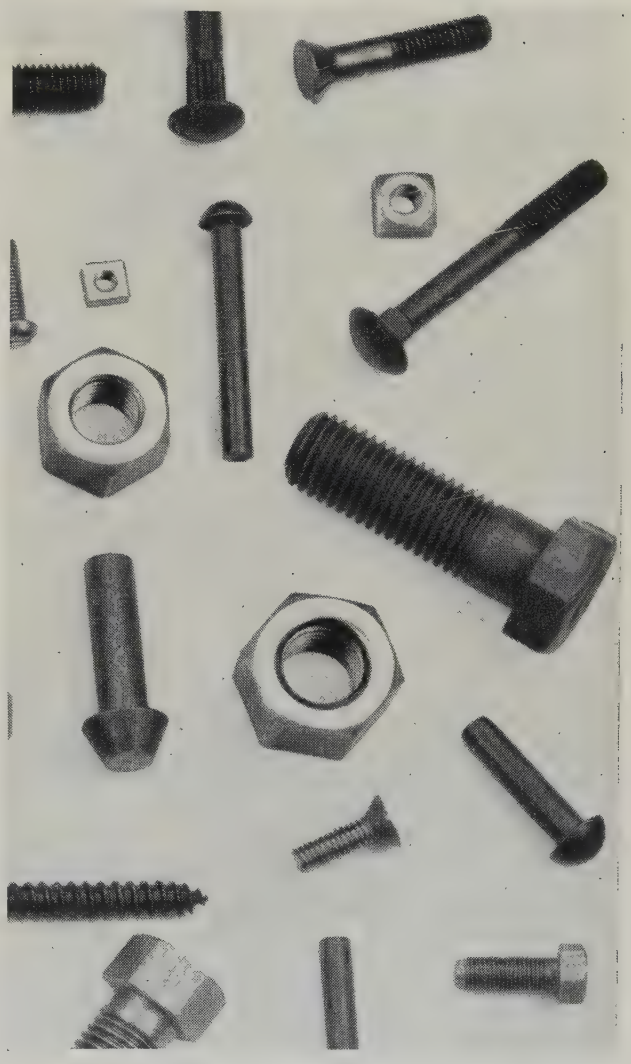
You can get exactly the fasteners you need for assembly or maintenance work from this big selection. It includes everything from machine bolts, track bolts, cap screws, large and small rivets to hot and cold punched nuts, semi-finished nuts, sheet metal screws.

Republic's Bolt and Nut Division also produces over 8,000 special types and sizes of fasteners. They include high-strength structural bolts, mine roof bolts, "Nylok" nuts, automotive and railroad special items.

Republic headed and threaded products are always uniform, easy to assemble, tough and strong to withstand shock and vibration.

When you buy fasteners you're interested in quality, uniformity, dependability, ease of application and long service life. You get them all in Republic Fasteners—plus prompt delivery.

On your next order specify Republic Fasteners. You can get them from your industrial distributor. If he doesn't have exactly what you need, he can get it in a hurry, because Republic makes and stocks more than 20,000 regular types and sizes. Mail the coupon for additional information.



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World's Widest Range of Standard Steels and Steel Products

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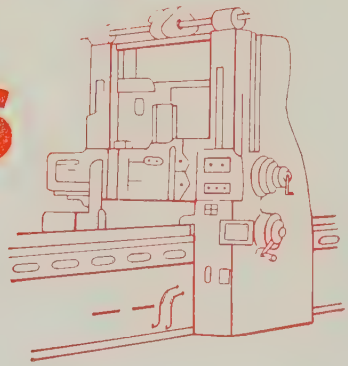

Investigate the important production, maintenance and tax savings of SIMMONS ENGINEERED REBUILDING for your: Lathes, Planers, Surface Grinders, Cylindrical Grinders, Vertical Millers, Openside Planers, Automatics, Vertical Boring Mills, Turret Lathes and Radial Drills.

A qualified Simmons rebuilding engineer will discuss it with you. Write, wire or phone today. Simmons Machine Tool Corporation, 1755 North Broadway, Albany 1, N. Y.

Write for Simmons Way... case histories of rebuilding jobs.

SIMMONS GIVES MACHINE TOOLS A NEW LEASE ON LIFE

Unconditional guarantee... our standard since 1910

WISCONSIN-POWERED LAD-E-VATOR hoist Speeds Up MATERIALS HANDLING ...CUTS COSTS!

This ingeniously designed extension hoist lifts materials up as high as 80 ft. in one minute, according to the builder, Campbell Equipment Co., Chicago, Ill. Provides easy, one man, one hand control and delivers all kinds of loose and bulk materials directly to the working area for automatic dumping or removal by workmen. Designed for use on construction or storage jobs, it eliminates dangerous swinging buckets and risky reaching operations. Can be used with platform, wheelbarrow or scoop, carrying up to 1,000 lbs. per load.

This is another typical assignment for the dependable foolproof Lugging Power of Wisconsin Heavy-Duty AIR-COOLED Engines . . . power that Fits the Job and the Equipment, delivering maximum on-the-job service with minimum servicing. You can't do better than to specify "Wisconsin Engine Power" for the equipment you design and build.

MOST H.P. HOURS

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

A 8322-⅓

(*Concluded from page* 97)

H. Stalbaum in charge. The company produces high-vacuum processing equipment, plastics molding presses, pharmaceutical machinery and industrial tabletting and powder metal presses.

General Engineering Expands

General Engineering Inc., Baltimore, is erecting a 38,000-sq-ft plant at Glen Arm, Baltimore county, Md. The company makes tools, dies and metal stampings; it concentrates mainly on small electronic and aircraft parts. I. C. Tillman is president.

Century Fan To Build Plant

Century Fan & Ventilator Co., Stamford, Conn., plans to build a $150,000 plant at Torrington, Conn. The company will continue manufacturing operations at its main plant in Stamford.

Brubaker Mfg. Changes Name

Brubaker Mfg. Co., Los Angeles, changed its name to Brubaker Electronics Inc. The company makes electronic systems for the military and test equipment and components for commercial users.

ASSOCIATIONS

Roger A. Yoder, secretary-treasurer, Detroit Steel Corp., Detroit, was elected a director of **Controllers Institute of America**, New York.

Prefabricated Home Manufacturers' Institute, Washington, elected P. S. Knox Jr., president. He heads Knox Corp., Thomson, Ga. Other officers of the institute are: Vice president, G. E. Price, National Homes Corp., Lafayette, Ind.; and secretary-treasurer, W. L. Mainland, Modern Homes Corp., Dearborn, Mich.

Bozell & Jacobs Inc. has been named to handle a special advertising and public relations campaign for the **Steel Plate Fabricators Association,** both of Chicago. The initial project involves a cam-

one is always out front

...and with high speed steels the pace setter is REX

Crucible's REX high speed steels have been way out in front ever since their introduction. And today they're still the *standard for comparison* wherever high speed steels are used.

There are many good reasons for REX's leadership — uniformity of size, structure, finish, response to heat treatment, tool performance. Each factor can be proved in your own shop, on your own work. So try this *standard for comparison* on a few jobs and you'll agree with thousands of users — *you can't find a high speed steel to outperform REX.*

Because of its extensive, nationwide use, REX high speed steel is carried in stock by the coast-to-coast chain of Crucible warehouses, or is available on quick mill delivery. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

PEARLITIC MALLEABLE CASTINGS

when operating conditions . . .

. . . are severe

If service conditions are unusually rugged and you're troubled by high manufacturing costs—look to pearlitic malleable castings!

Pearlitic malleable has high fluidity that casts easily into complicated shapes. It resists wear under heavy loads at high speeds . . . has high ultimate strength . . . possesses excellent non-seizing properties for bearing surfaces . . . can be given a very smooth finish where desired . . . and can be either liquid quenched or air quenched. And perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel = 100).

So look your product over critically. Then check pearlitic malleable castings. They can replace more expensive methods of fabrication or manufacture . . . can lead to reduced weight, less machining time . . . fewer assembly operations . . . *greater sales appeal for your product.* AA-166

NATIONAL MALLEABLE AND STEEL CASTINGS

COMPANY
Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

paign promoting the use of steel pipe for conveying water.

American Supply & Machinery Manufacturers' Association, Pittsburgh, elected Clarence B. Noelting president, succeeding T. D. Vander Voort of Clemson Bros. Inc., Middletown, N. Y. (STEEL, Apr. 25, page 53). Mr. Noelting is executive vice president and general sales manager, Faultless Caster Corp., Evansville, Ind.

CLARENCE B. NOELTING
. . . president of ASMMA

Other officers of the ASMMA are: First vice president, C. T. Jordan, Charles Parker Co., Meriden, Conn.; second vice president, R. L. Hamilton, Dumore Co., Racine, Wis.; secretary, L. H. Bellows, Sheldon Machine Co. Inc., Chicago; and treasurer, D. C. Swander Jr., Columbian Vise & Mfg. Co., Cleveland.

NEW ADDRESSES

Firth Sterling Inc., Pittsburgh, moved its southwest district office to 831 S. 75th St., Houston. This was prompted by the firm's recent acquisition of Houston Carbide Corp. Firth Sterling produces high-speed tool and die steels and sintered carbide products.

Ziv Steel & Wire Co., Chicago, moved its Milwaukee office and warehouse to 225 S. 38th St.

UNITED

35,000 TON FORGING PRESS

A NEW 35,000 ton hydraulic forging press being built by UNITED for the USAF Heavy Press Expansion Program to help bring the United States to a commanding position in the production of modern aircraft for the armed services.

UNITED

ENGINEERING AND FOUNDRY COMPANY

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Plants at: Pittsburgh • Vandergrift • Youngstown • Canton
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Subsidiaries: Adamson United Company, Akron, Ohio
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Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

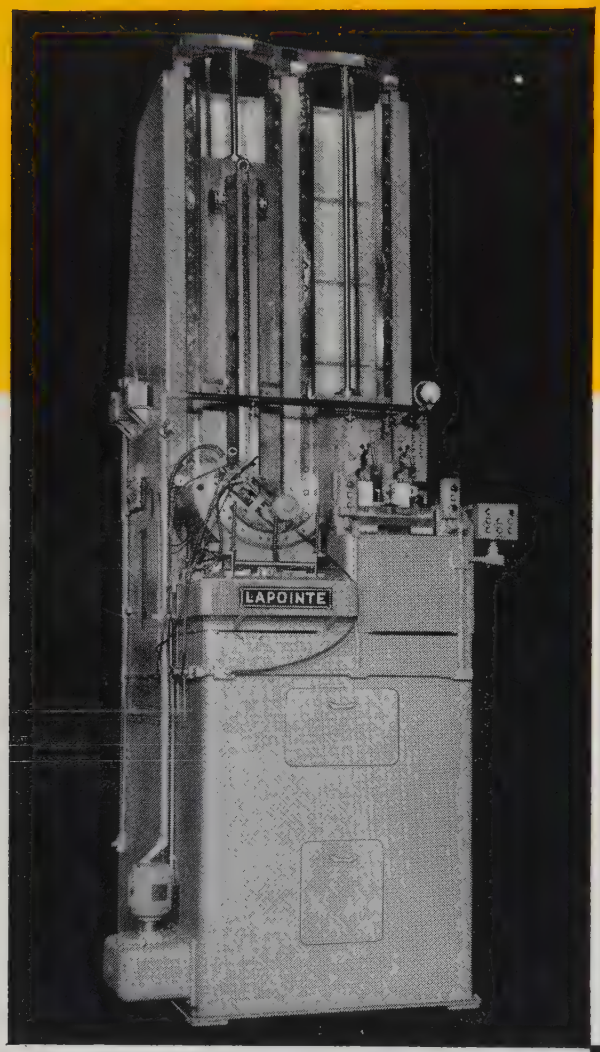
this double-ram vertical

LAPOINTE BROACHING MACHINE

with electro-mechanical drive

lends itself to carbide tooling because of its

higher speed ranges



here's BROACHING EFFICIENCY at its best!

Simultaneous broaching of rotor wheel slots and mating buckets (the latter requiring two progressive operations).

. . . that's balanced production!

125 broaching cycles per hour, at 80% efficiency, producing these parts faster than by any other known method.

. . . that's volume production!

No loss through rejections, because all parts are formed perfectly and to the close tolerances required of jet engine components.

. . . that's quality production!

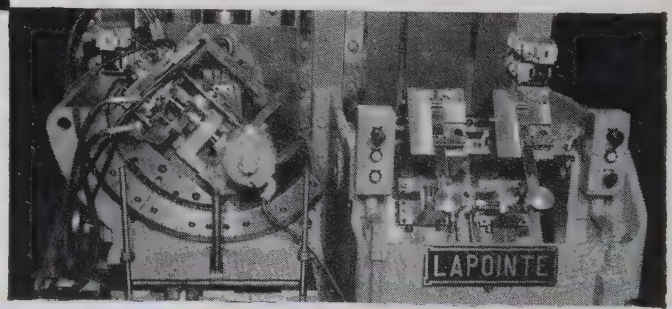
One operator easily and safely handles this double ram machine, loading one ram while the other ram is broaching.

. . . that's efficient production!

FOR 53 YEARS LAPOINTE has been designing, engineering, and building broaching machines, tools and fixtures. That's all we do. It's no wonder that production men most naturally look to Lapointe to solve any broaching problem.

TWO UNIQUE FIXTURES make this high production possible, the Lapointe IN-and-OUT self-indexing type for the rotor wheel slots (see ram on left), and the TIP-DOWN type for the mating buckets (see ram on right). The Tip-Down type fixture is exclusive with Lapointe.

If you would like a description of this LAPOINTE double-ram vertical broaching machine ask for Bulletin DRVE-3.



THE LAPOINTE MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

In England: Watford, Hertfordshire

HUDSON LAPOINTE MASS

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

Technical Outlook

ALUMINUM CRANES—Appropriately, the seven, mill-type overhead cranes ordered for Kaiser Aluminum & Chemical Corp.'s new plant at Ravenswood, W. Va., will be built mostly of aluminum. They'll have 105-ft spans. Weight saving is figured at 35 per cent. Other benefits: Lower foundation costs, lighter building framework and craneways, lower power requirements and less painting. Kaiser's new structural alloy, 5083, will be used to the tune of 315 tons.

STAINLESS REVISED—AISI has revised its designations for stainless steels. Changes reflect improved melting practice, ability of producers to work to closer specifications and the end of government controls. You'll find the complete story on page 159.

BEARINGS UNDER WRAPS—For the last three years, an automated assembly line has been turning out bearings at the Bucyrus, O., plant of the Timken Roller Bearing Co. Seamless tubing goes in one end and packaged bearings come out the other without a hand touching the product. Fifteen sizes, including front wheel bearings for autos, are produced. The line represents a $9-million investment in plant and equipment.

QUANTITY PLASTIC—Each day more than 26 tons of reinforced plastic goes to Chrysler Corp., mostly for car heater housings. That's 2600 tons a year of mixed polyester resin, sisal and glass fiber. "We're the country's biggest consumer of these resins," says Chrysler.

BLOCK HYDROGEN—There'll be cause for celebration when someone licks hydrogen embrittlement of titanium. It will be done by quality control and proper alloy selection, says Battelle Memorial Institute. The institute points out that alpha-beta titanium alloys with high tolerance for hydrogen appear possible. Aluminum additions are beneficial. And titanium-molybdenum alloys are especially tolerant of hydrogen.

HYDRAULIC ANTILEAK—An acrylate - type elastomer called Vyram will stop the leaks in hydraulic systems, says Monsanto Chemical Co. It's a new material for packings and seals which will withstand both petroleum and ester-based fluids.

INDUCTION HEATED INGOTS—They're using dual frequency induction heat to good advantage at Western Canada Steel Co. Ltd., Vancouver, B.C. Heating time is cut about 75 per cent, production is up 30 per cent and savings on fuel are about $1 a ton. Its 10,000-hp output makes this probably the largest induction unit ever built. Power consumption is in the neighborhood of 4-million kw a month.

ALDIP EVOLUTION—Aldip has given way to Alspray (another GM development) at Thompson Products Inc. Engine valves are first metallized by aluminum spraying before being fluxed in a molten salt bath. Resulting iron-aluminum alloy coating has excellent resistance to high-temperature oxidation, and increases exhaust valve life up to 500 per cent.

MAGNESIUM COATING—Add NBS to the list of electrolytic coatings for magnesium. Developed by the Bureau of Standards, it is not so smooth as HAE and the acid-chromate coatings, but requires only a low-voltage power supply and simple chemicals. Electrolyte is sodium or potassium hydroxide, the corresponding chromate and water.

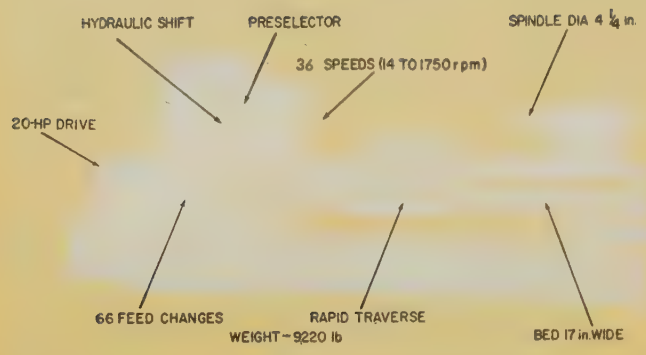
Metalworking Outlook—p. 57 Market Outlook—p. 145

TURNING

Obsolescence of turning equipment and techniques is stealing dollars from at least a third of all plants doing machining.

Here are the trends that have changed the picture—

1955



These two lathes, built by the same company, are typical of their respective eras. Although developments come one at a time and may appear to be minor, improvement is evident over a period of several years.

Advances in a machine's ability to remove metal are hard to estimate. They could be based on the old formula: You can remove 1 cu in. of metal (mild steel) per minute, per unit of horsepower. Double the horsepower, and you take off metal twice as fast. Bonus is that builders are getting more horsepower through to the spindle. So capacity to remove metal jumps more than the increase in motor rating.

1945

LIKE the Detroit dreamboat of today, turning has become a souped-up version of what it was 10 or 15 years ago.

The principle of getting a cutting tool into the workpiece hasn't changed, but both the equipment and techniques that put the cutter to work have made the operation faster and more efficient than it ever has been.

Across the Board — Improvements have been made on almost every phase of the turning operation. When properly applied, they spell a smaller outlay of dollars per piece produced.

In terms most important to the user, those of the workpiece itself, here are the prevalent trends.

Work Rate — Improved cutting tools, machines and cutting fluids (plus new concepts of possible speeds) are making it practical to turn out parts in a fraction of the time that was standard a few years ago. Most alloy steels can be turned at 450 to 600 sfm. In one case, a stainless steel forging is semifinished at 1080 sfm.

The metal removal potential of machines and cutters has been upgraded. Wider speed ranges, more power and rigidity on the part of the machine and better cutter ma-

als (such as the new carbides ineered for steel) fit the pic-e. Carbides are going to work automatic bar machines, a hold- operation until recently.

Quality—Tolerances can be held closely on some jobs that a sec-lary operation is eliminated. idity of the machine contrib-s to this. So does a general talworking trend of closer speci-tions, since it applies also to chine tool manufacture.

Good surface finish can be ob-ied more easily. One impor-t reason: With a more com-e range of cutting speeds, op-um cutting conditions can be d. Generally, surface finish roves at higher cutting speeds. h optimum cutting conditions, tter (which marks work) also inimal.

own Time—New machines are neered with an eye to main-nce. It takes less time to nge tools with mechanically , carbide cutter tips that can ndexed to new cutting edges to eight) without resetting the

Carbide makers figure these xables will be 30 per cent of carbide business; they'll be wn away after they are used— eliminate regrinding, prune tool change time to a tenth of what it was.

Builders, talking about machines they'll exhibit at the September show, cite a general speed up in machine handling time, a first cousin to down time. New machines can be easily, almost gracefully, manipulated for optimum cutting, to make for fewer and shorter interruptions of the primary function—cutting metal. Improvements range from completely automatic cycle control to improved location and operation of hand levers.

Easier operation can improve the machining operation. It's no secret that practice on many machines has been to use one speed on all diameters. Time is saved by not making any speed changes. The compromise boils down to one (or both) of two things: Tool life is sacrificed on large diameters, or time is lost on small diameters.

With easier-to-operate machines, there will be greater operator willingness to use optimum cutting conditions for each cut, even if it means making a change in speed. The point of using one surface speed has been well made as it applies to large facing cuts. It should be extended to shaft turning.

Details—"Optimum cutting conditions" machining men talk about are the sum of the right combination of a series of details: Putting the right tool material with the right shape into the workpiece at the right speed and feed for the material, and using the right cuting fluid to facilitate cutting and improve tool life.

Many of the variables could be changed overnight on jobs now running. Case histories show some are worth checking:

. . . a Detroit auto builder switched to a steel-cutting carbide for axle turning and jumped pieces per grind more than one-third.

. . . a similar carbide change boosted tool life 122 per cent for a machine tool builder turning cast iron parts.

. . . turning 416 stainless steel on a turret lathe, another manufacturer is saving $160.50 a week on cutters and cutter grinding. He picked the right cutting fluid for the job.

Nothing unique is involved. A relatively simple change brought savings many times greater than the cost of the change itself.

Automation—From transfer machines and their lathe stations, down through multiple-spindle automatics (early birds in automation) to standard engine and toolroom lathes, turning is part of the automation trend. Controls already mentioned are only part of the story.

Automatic loading and unloading of automatic lathes are old hat. Out of it, though, came the development of loading devices for other lathes. Turret lathes, for example, are being equipped with loading and/or locating devices to assist in handling heavy, complex parts. One hydraulic loader increased production of a turret lathe 15 per cent.

Contouring—Perhaps the simplest way to add a touch of automation to an otherwise manual operation is to put a tracer attachment on the machine. A pretty inexpensive investment, it can incorporate several advantages.

The tracer removes most of the human element from turning—improves duplication of dimensions from one part to the next. It slims down machine handling time by sidestepping the resetting of the tool or tools for multiple operation. It simplifies setup and changeover time from one job to another by replacing multiple tooling with a single-point cutter.

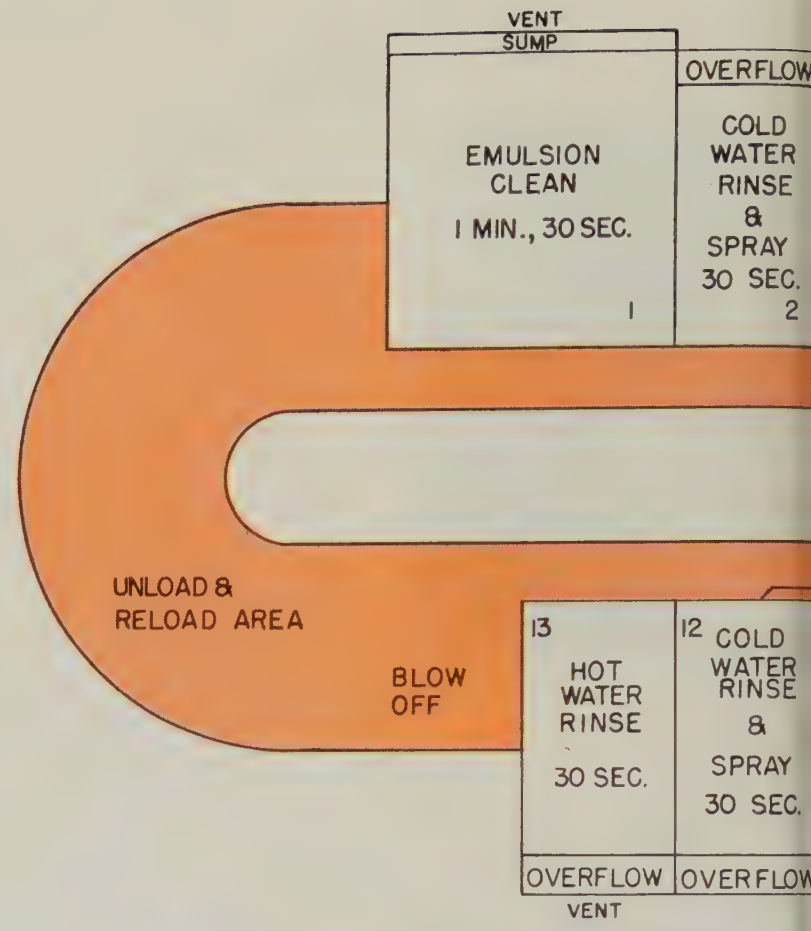
The big problem for suppliers of turning equipment and tooling is to get users to analyze their jobs and practices, to adopt new methods when they are justified economically.

The obsolescence factor, then, is the target at which suppliers will aim for the peace-time market.

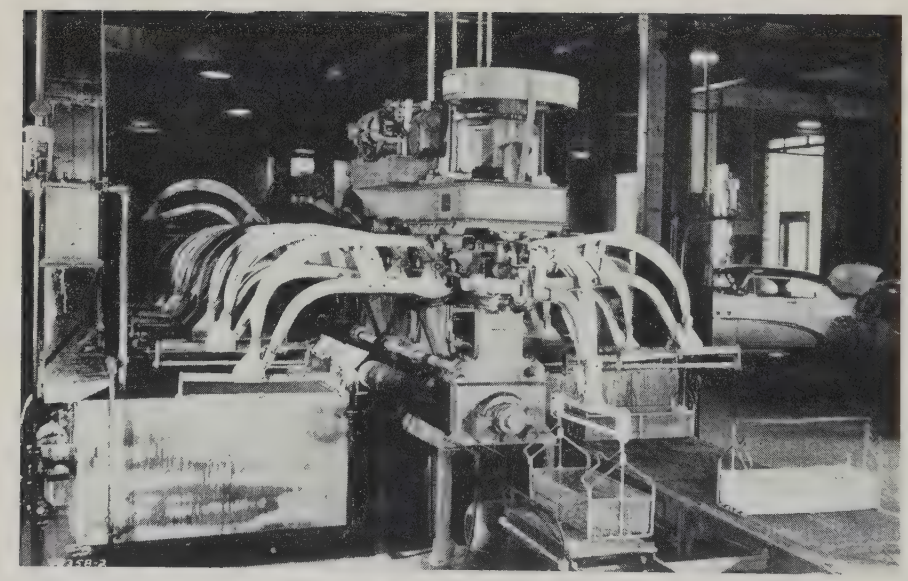
This is the first in a series of articles on Machining . . . 1955. Others will be on milling, forming, drilling and boring, planing and grinding.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department,* STEEL, *1213 W. Third St., Cleveland 13, O.*

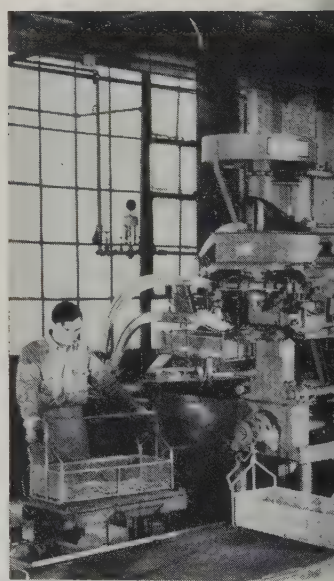
At a second's notice this automatic line can adjust its sequence for brass or aluminum. Now even the smaller operators can profit from machine dipping



Bright-Dip Line for Aluminu



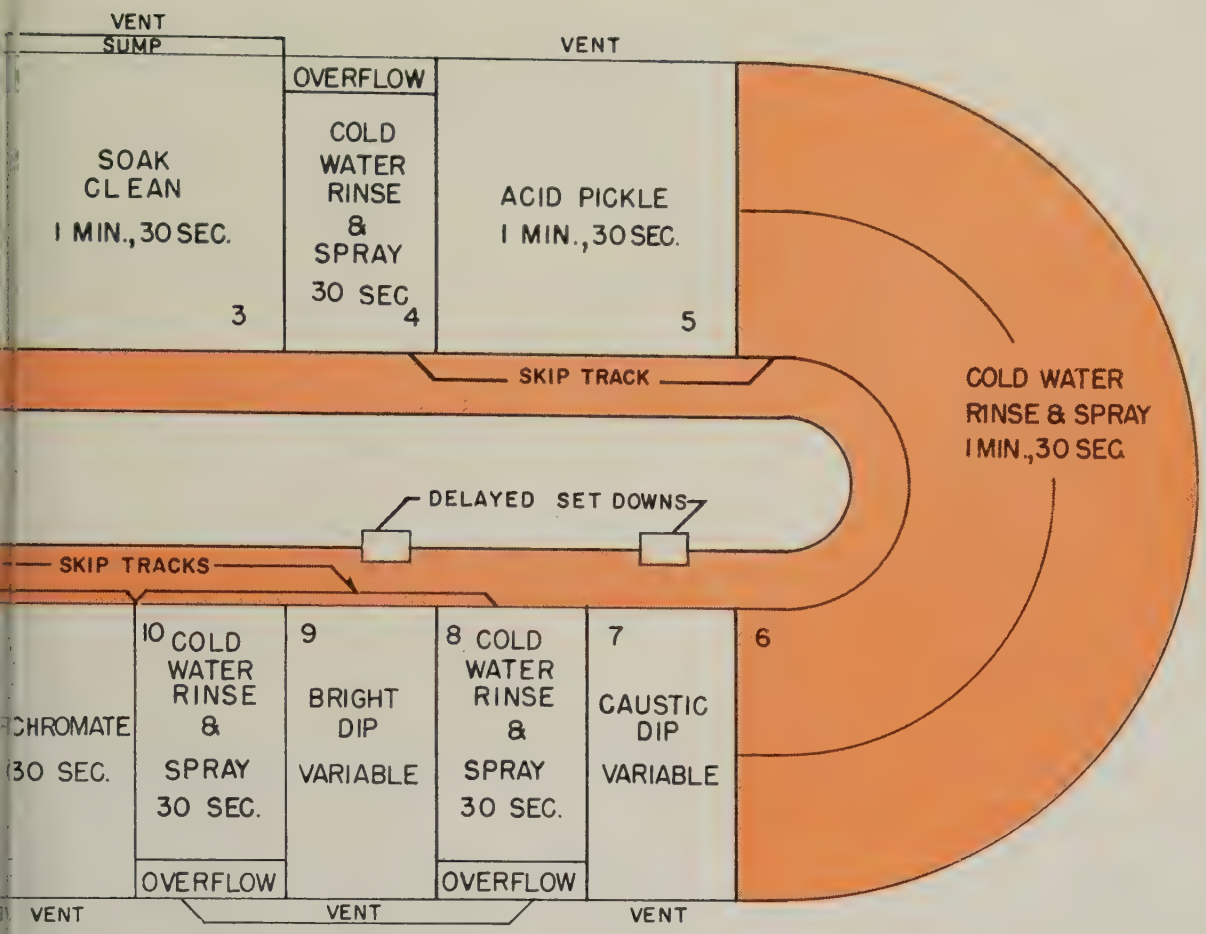
Loading end shows basket pickup car, center, and exit conveyor, right. Raised arm on left-hand row, indicates separately timed control at the acid tank



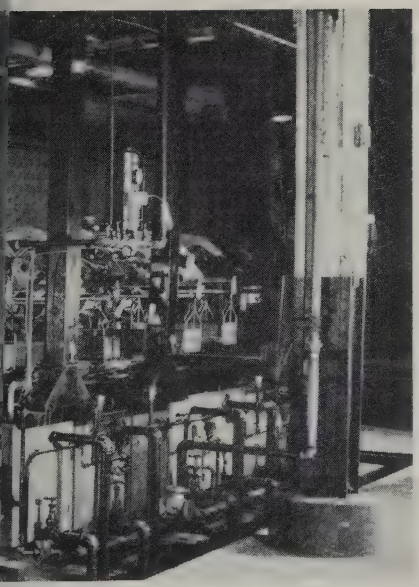
This view illustrates compactness the machine. Two men can turn

WHEN YOU THINK of automatic bright dip and cleaning equipment, it's generally in connection with the automakers or some of the big appliance manufacturers.

The arguments against extensive application of big and complicated processing installations by relatively small job shops center on the high initial cost and limited quantities of parts in proces While this may be a fairly acc rate rule-of-thumb, it has notab exceptions. One can be found Harvey Metal Corp., Chicago.



Brass



ut 2000 lb in an hour. Manual
ration used to take 11 men

Production Setup—The company
a producer of brass and alu-
inum forgings, with its most im-
rtant markets in builders hard-
are, aircraft components and other military parts. Operating in a two-story plant setup, its production layout calls for parts to progress from forging equipment through temporary storage in tote bins to bright dip or cleaning.

The second floor houses subsequent fabricating operations specified to produce finished parts.

Question of Space — Until recently, Harvey handled all its cleaning and bright processing through a series of dip tanks.

The question of fast, automatic processing arose when job orders caught up with these facilities and made expansion mandatory. Simply to increase manual equipment was impossible space-wise, in light of contemplated production. In terms of present volume, it would have meant increasing from one to four the number of manual dip installations in operation.

And Manpower—The full automatic processing machine Harvey installed, a Frederic B. Stevens model B, occupies 15 ft x 34 ft 6 in. Loading and unloading facilities expand these dimensions to 15 x 50 ft.

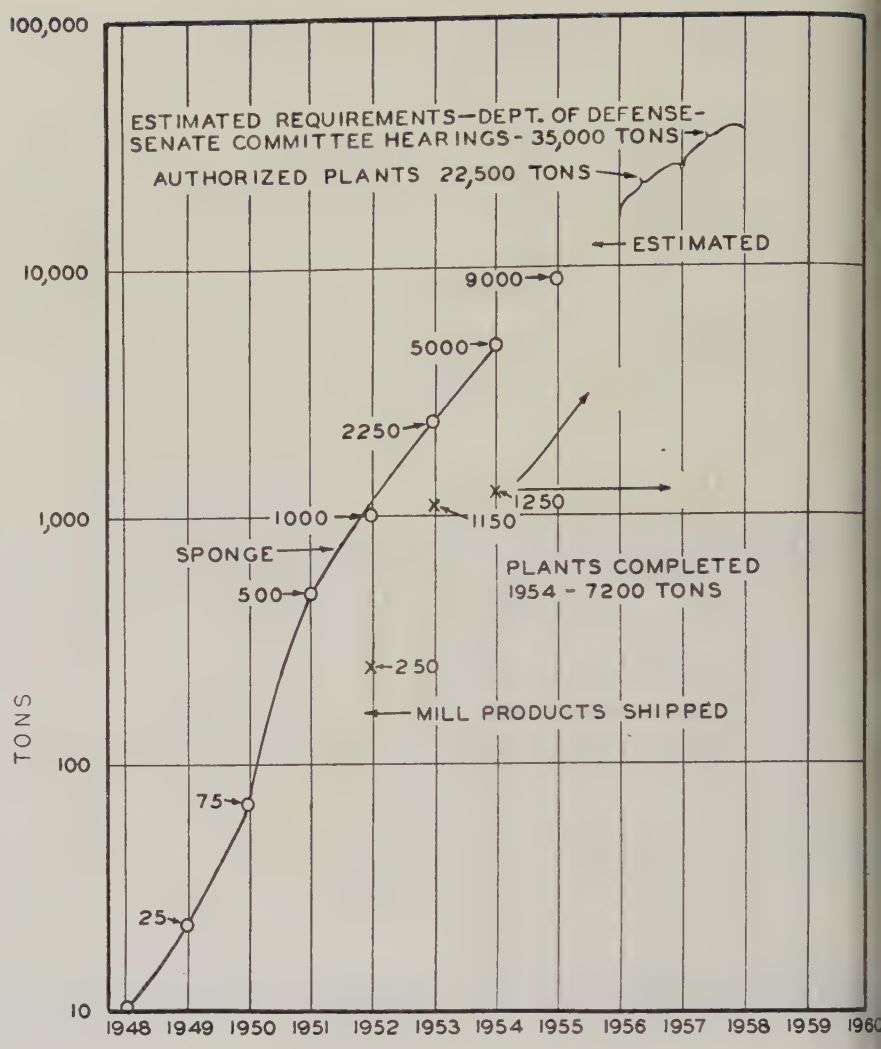
Of course, there are other considerations. The manual setup in operation before installation of the automatic processor required 11 men for full capacity operation. The automatic processor takes two. In addition, over-all volume of waste water is decreased—always important on a job of this type.

The old manual equipment was kept on hand. There's enough business involved in specials to keep a pair of men busy—it is also used as stand-by capacity.

In Operation — The model has single-row-type carrier arms on 30-in. centers. Production, with 60 arms, is about 2000 lb per hour. Tanks are 48 in. wide x 30 in. deep. Ventilation is from both sides of the tanks.

Unloading is accomplished automatically through a bolster arrangement that lifts each arm as it reaches the end of the cycle and deposits the baskets on a continuous belt conveyor. The latter feeds baskets or parts to an operator for loading into a tote box and movement to subsequent processing.

At the Ninth Western Metal Congress Held in Los Angeles, Walter L. Finlay, Vice President, Rem-Cru Titanium Inc., Discussed Titanium's Problems and Opportunities. As Chairman of the Titanium Panel Session, Here's What He Said . . .



What's Being Done About Titanium's Troubles

FOUR MAJOR roadblocks are holding titanium back: 1. Its possible scarcity. 2. Technical difficulties. 3. The need for better design properties. 4. Its cost.

There is the feeling among users that as soon as one large production application comes along titanium will be in short supply.

The facts: There is plenty of titanium now, but there won't be in the future unless demand is steady. Otherwise, the new industry can't develop.

Technical Problems — They include mechanical features, like surface finish and flatness, excessively wide variations in properties and embrittlement.

Definite progress is being made. A good example is the improvement in sheet flatness. Below is a comparison of Rem-Cru sheets having a flatness of less than 2 per cent:

	1953	1954
A 70 (pure) . . .	44.4%	77.3%
C 110M (alloy) .	43.2%	76.4%

Delayed Cracking—This is an embrittlement problem. A part cracks some time after it has been formed and assembled. With 8-per-cent manganese sheet, it is usually the result of a combination of three factors: 1. Externally applied stresses. 2. A notch sensitive condition. 3. Metallurgical and/or mechanical notches

Where do these troublemakers come from?

Stresses arise in assembly and in service. The site of notch sensitivity in 8-per-cent manganese is chiefly in the alpha-beta interface. The immediate cause is the embrittlement of these interfaces by hydrides, oxides, nitrides, coherent alpha, etc.

Causes — Metallurgical notches can start with embrittled alpha-beta interfaces. Mechanical notches may arise from shearing, blanking and riveting.

The basic cause of delayed

acking is notch sensitization. It ems from a series of embrittled terfaces between the particles of pha and beta titanium, which ake up alpha-beta alloys (like 110M).

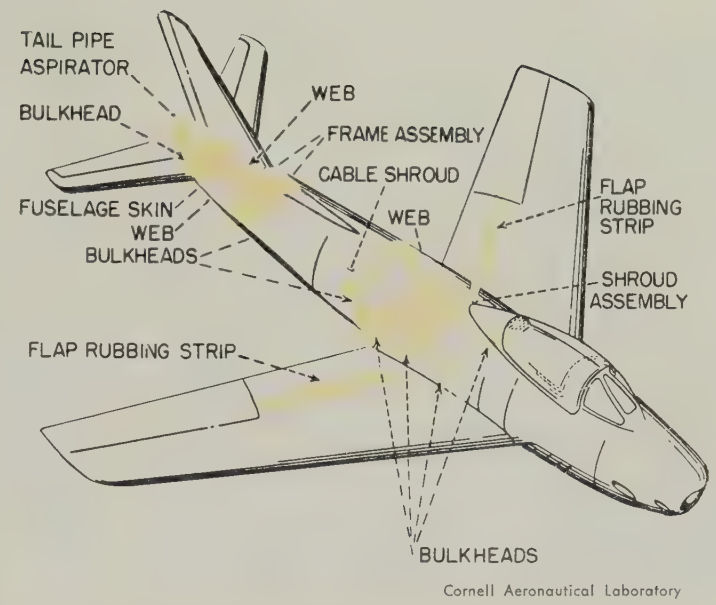
The interfaces are not in themlves brittle. But they are subct to embrittlement by impurities like oxides, carbides, nitrides nd hydrides. Another cause is nproper processing, such as rollg temperatures which are too igh. Titanium producers are aking every effort to minimize mbrittling tendencies.

Stabilized — Unalloyed titanium entirely alpha up to yellow eat. At higher temperatures, it ransforms to the beta phase. By dding manganese, some beta is tabilized to room temperature.

Beta imparts good bendability. Meaning: Even though the 8-perent manganese alloy has almost wice the strength of pure (unalyed) titanium, its bend ductility s about as good.

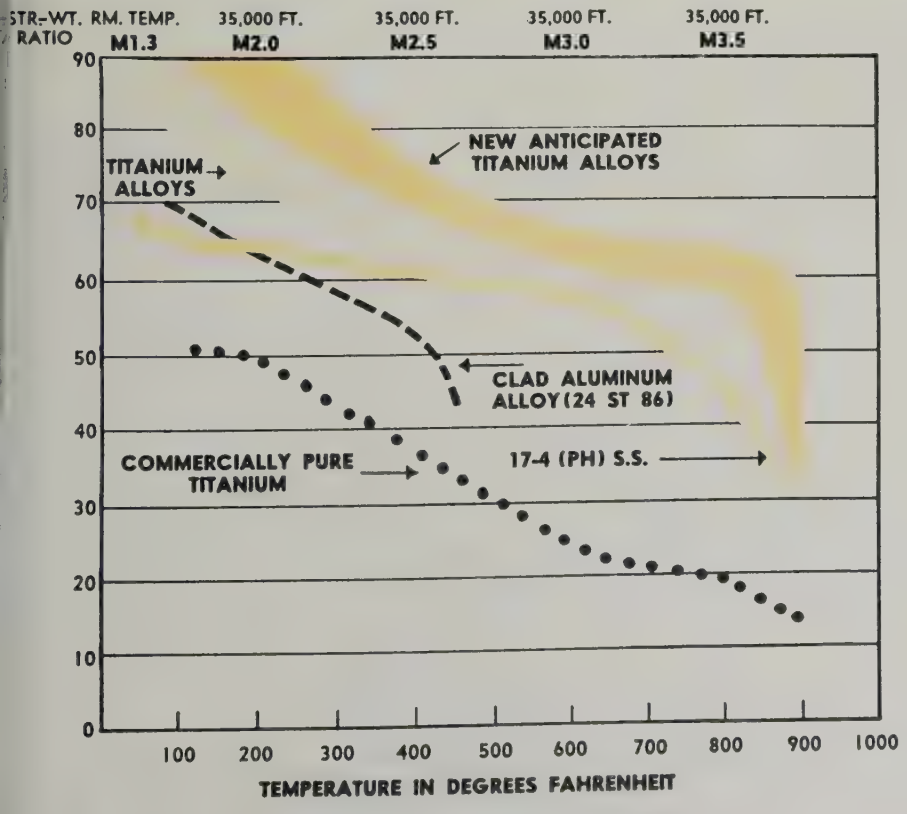
To cure delayed cracking, fabrators are reducing stresses and notches in airframe parts. Producers are plugging all loopholes o minimize the pick up of hydrogen and oxygen and the formation of unstable embrittled interfaces.

Start—Basic reason for the existence of structural titanium is its strength-weight advantage.



Cornell Aeronautical Laboratory

Typical uses of titanium in a jet fighter



Air Force General Metzger's strength-weight ratios of titanium and other aircraft materials at elevated temperatures

New properties, like higher stiffness and ductile weldability, must be combined with present strength levels. Higher strength-weight ratios must be reached to keep the industry healthy and expanding.

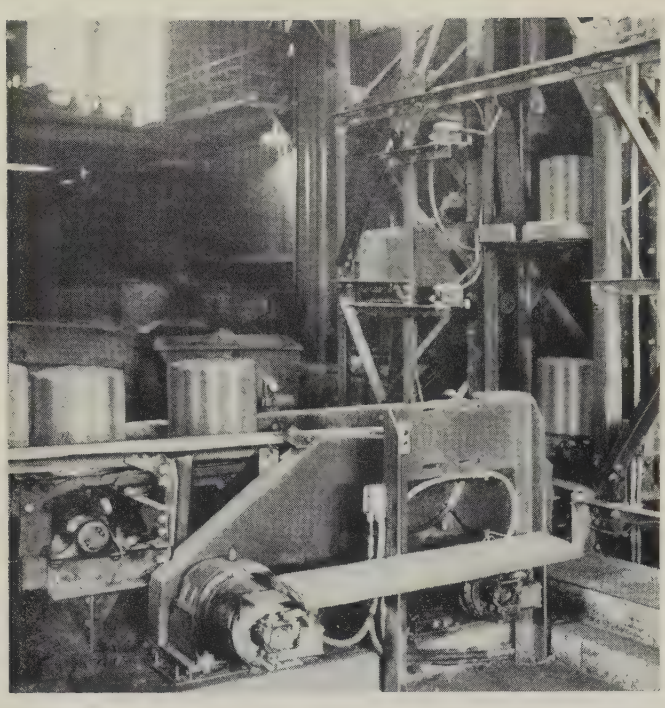
Green Pastures—New alloys are in the making. Some types will offer high formability and medium to high strength. Others will have a high elastic modulus with high hot strength. But the first major feature of each new grade generally is its strength.

One avenue of approach: Alloys that can be heat treated to high-strength levels while retaining needed ductility.

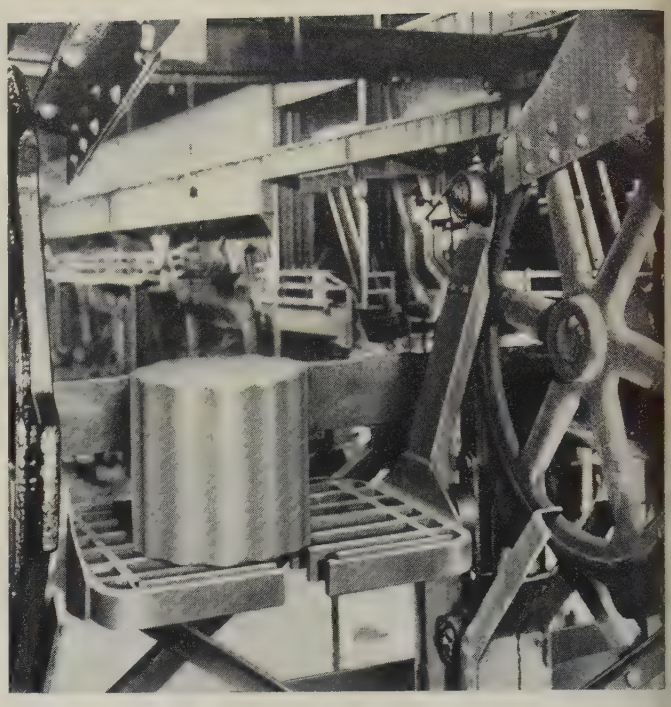
Expensive — Another question users are asking: When will price come down enough to mean something?

The outlook is promising. When sponge gets substantially cheaper, the prices of mill products can be one-half (or less) of what they are today.

But lower prices hinge on two "ifs." 1. If the present gap between the oversupply of sponge and the puny demand for mill products is closed promptly. 2. If in the next three to five years the demand for mill products gets up to 10,000 to 20,000 tons a year.



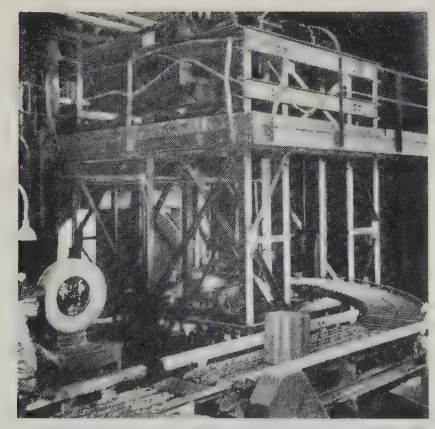
String of ingot slices is fed into the tray conveyor loading station for its trip to the rolling mill



After rising vertically for 20 ft, trays change direction over this sprocket and move horizontally for 168 ft

No More Feast-or-Famine Handling

A continuous system eliminates batch moving of ingots by rail. Now they arrive one at a time and there's no storage problem at either end



Once inside the mill building, trays drop down, discharge their loads and head back. System has 26 trays in all

WHY MOVE INGOTS nearly a mile when their destination is only 200 ft away? That's what Standard Steel Works officials asked themselves every time they looked at their handling system in the Burnham, Pa., plant. Standard specializes in the manufacture of locomotive wheels and tires and other heavy steel castings and forgings.

With a new system designed and built by Jeffrey Mfg. Co., Columbus, O., the company estimates a 75 per cent reduction in handling, plus considerable saving of storage space in their open hearth shop where space is at a premium.

The New Way—Instead of accumulating ingot slices in railroad flat cars and then shunting them to the wheel rolling mill, the conveyor system handles ingots continuously. There is no stockpiling at either end, no feast-or-famine handling schedules.

An electric magnet places ingots on a spring-mounted gravity roller conveyor which feeds a steady supply to the gathering conveyor. This particular unit positions each ingot on a loading station where the endless tray conveyor can pick them up for the trip to the rolling mill.

Away They Go—The tray conveyor first rises vertically for 20 ft, levels off to a 25 degree incline while it travels 111 ft across three railroad tracks and a road, rides horizontally for another 57 ft and then descends vertically to the receiving station in the rolling mill.

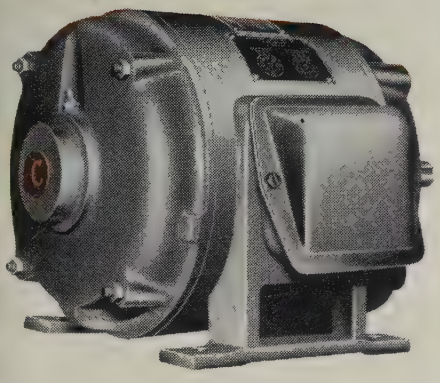
This station is similar to the one at the other end except that the sequence is reversed. Ingots leave the station on gravity rollers, then travel on two short chain conveyors past the weighing station and down to floor level where a magnet moves them either to the furnace conveyor or to storage.

From loading to discharge takes only 3¼ minutes. Capacity is four ingots per minute, and maximum size is 2200 lb.

A case of SHEAR necessity

HERE'S HOW A Century MOTOR IS Performance-Rated©

TO BRING OUT THE BEST IN THIS MASSIVE MACHINE

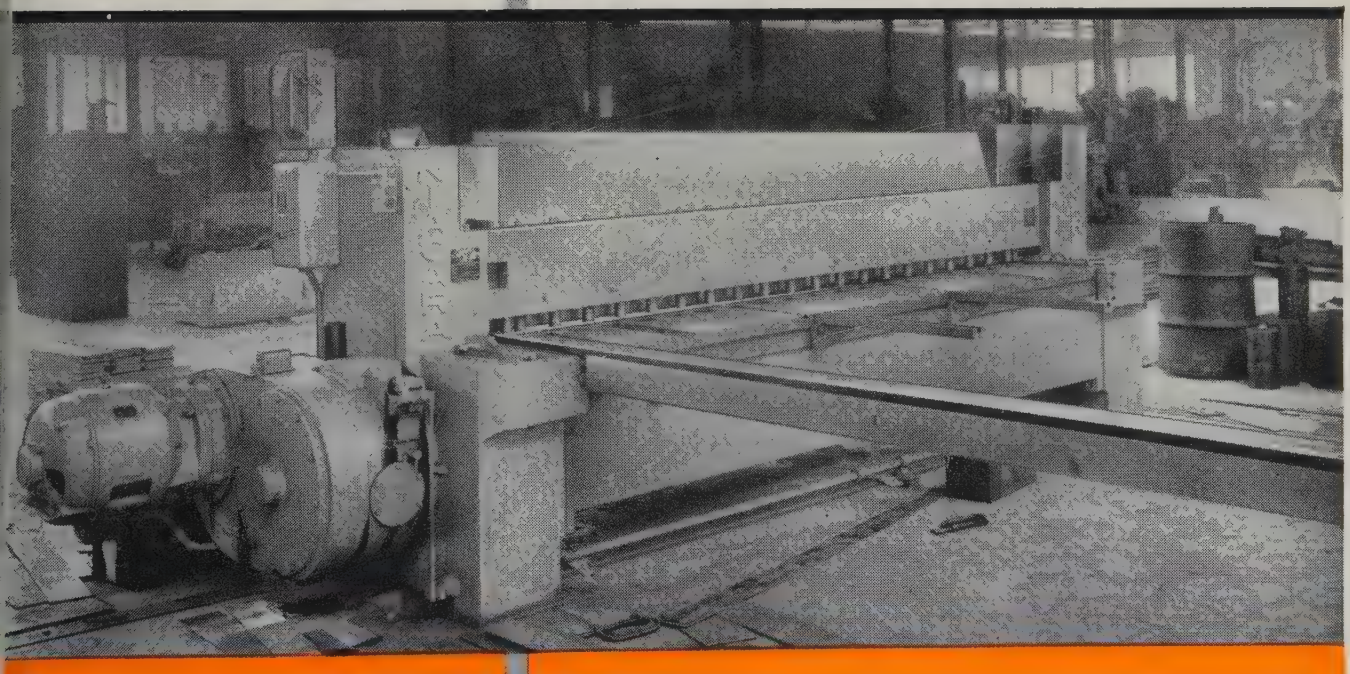


Machine Tool Motors... AC or DC... drip proof, dust proof or explosion proof frames.

This particular shock load required the speed-torque characteristics of NEMA Design "B" in a 10 H.P. polyphase motor. Century provided it in a protected, drip proof frame, with compact direct flange mounting and the terminal box out of the way at the bottom of the motor.

The owner of this shear says: "Say anything you want about it. It's giving me everything I expected... and more!"

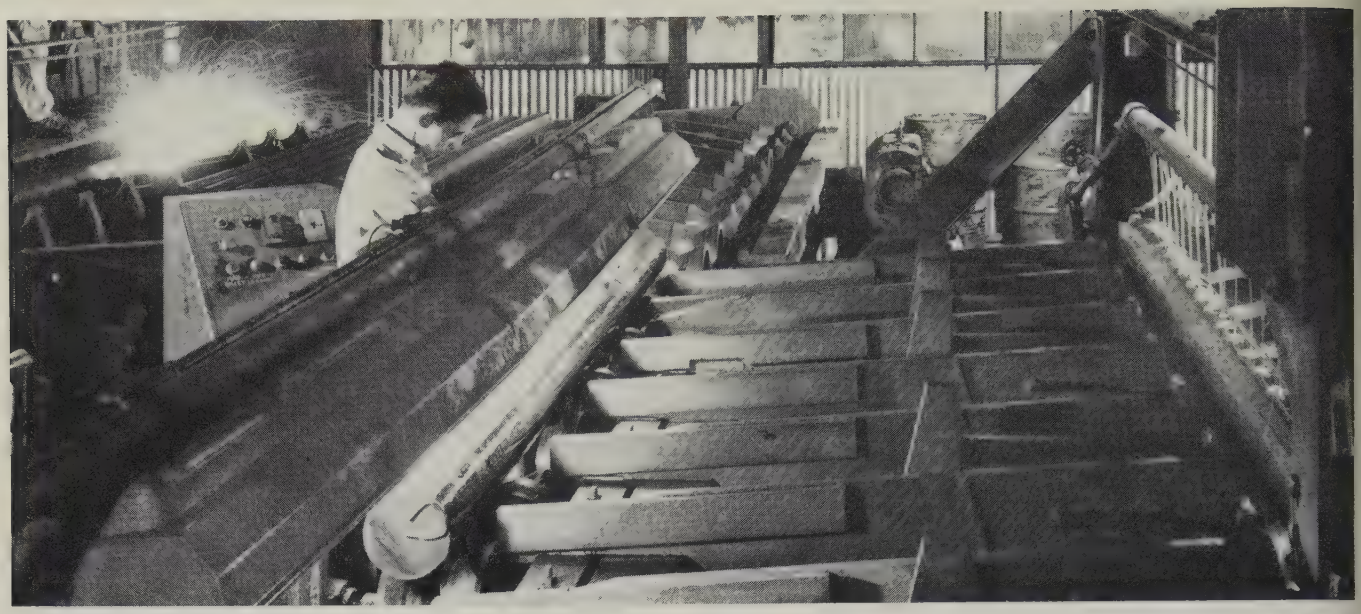
Century Performance-Rating makes it possible to select from Century's complete line precisely the right motor size, speed, torque and frame to bring out the best performance in your equipment. Specify Century motors on your new equipment... or as replacements on your present machines. Call your nearest Century District Office or Authorized Century Distributor.



Performance-Rated© Motors
1/8 to 400 H. P.

CENTURY ELECTRIC COMPANY

1806 PINE STREET • ST. LOUIS 3, MISSOURI



This compact department is Timken's . . .

Short Cut in Billet Conditioning

THEY'VE COMBINED billet inspection and handling at Timken Roller Bearing Co., Canton, O., with profit-producing results. Yield from the tube mill is improved, handling is greatly reduced and pickling has been eliminated.

The operation stems from an idea to apply magnetic particle inspection to all semifinished steel destined for the tube mill. Billets, with the mill scale still on them, go directly to the unit, are inspected, conditioned and then sent to the tube mill for charging. This eliminates handling in the pickling, inspection and conditioning processes.

Lead time between the bar mill and the piercing mill has been reduced drastically, stepping up delivery time on orders.

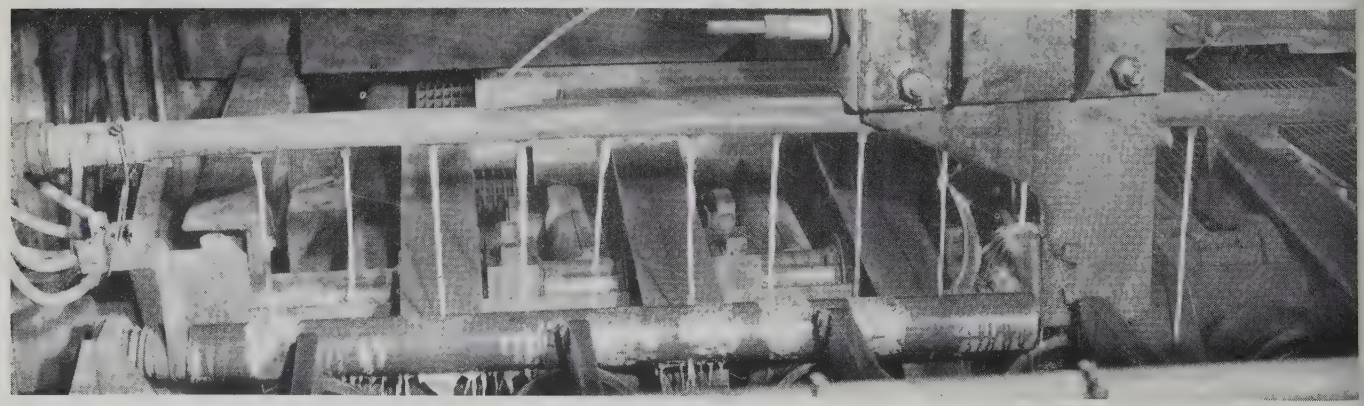
Here's How—Fork trucks charge a load of billets onto an incline that extends outside the building. A set of fingers picks off one billet at a time from the charging bed and rolls it to the magnetizing station. A traveling electrode head pushes the billet against a stationary electrode head, and the billet becomes magnetized.

From above, a series of nozzles sprays a water solution containing the magnetic particles over the billet. Particles build up in flaw areas where they can be spotted readily.

The operator pushes a button which allows the billet to roll onto inspection rolls which are under an ultraviolet light. After defects are marked, the inspecting rolls are lowered and a conveyor roll table moves the billet to the scarfing bed.

Cleanup—The scarfer works on a platform above the scarfing bed

Magnetic particle solution sprays on the billet while it is magnetized

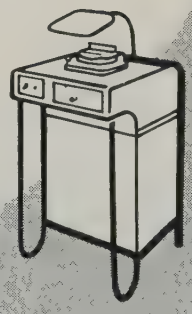


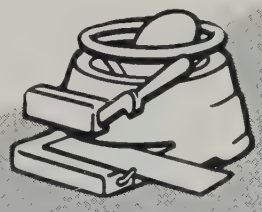
What goes on here?

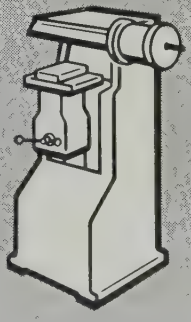
Ask this question often . . . about all your processes. You'll discover a lot of interesting things about your men, your methods, and your money.

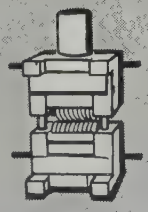
If marking is one of your processes, ask the question in terms of *what men and how many;* in terms of *which method* and *at what stage of manufacture;* in terms of *how much per mark.*

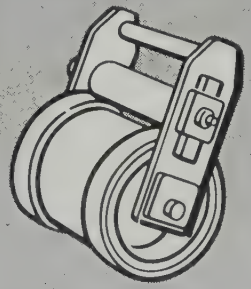
There are many, many answers, and among them we've usually found the one that's best. Let us help you use your men, methods and money to their best advantage. Consult your Matthews Representative about YOUR MARKING today.











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The heavy demand for J&L sheet steel to be used in the manufacture of steel roof decks points up the growing acceptance for this method of construction. In addition, it provides evidence of the manufacturer's confidence in J&L's ability to furnish quality steel exactly to specification.

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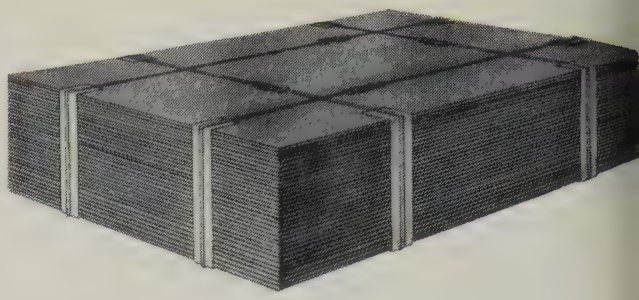

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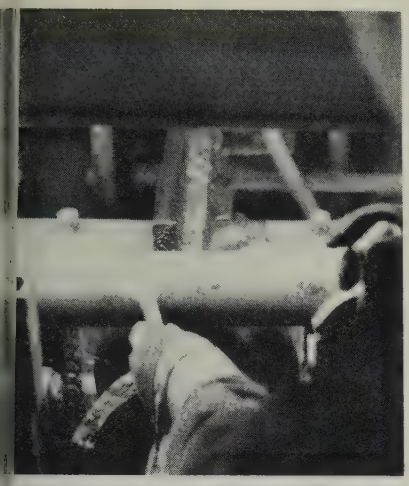
STEEL CORPORATION — *Pittsburgh*



s is what the inspector sees when e billet is scanned under ultraviolet ht. Defects are marked for scarfer

d controls the movement of the lls. Each defect is burned out, d the billet is rolled onto the scharge table for fork-lift move- ent either to the piercing mill rnace or the ready yard.

The unit will handle a wide nge of sizes and lengths, with actically no adjustment. Billets e magnetized with circular mag- tism induced by a heavy-duty wer pack built by the Magna- ux Corp.

The workforce consists of a ree-man crew—they rotate on e different jobs. The same fork uck serves both the inspection nit and the piercing mill. Inspec- on is scheduled by the mill stock- foreman so that it conforms to e needs of the mill.

llets move automatically into the arfing rolls where defects are quick- burned away

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

AF Still Stalls . . .

STILL NO action on the Air Force's reserve machine tool program. It's getting to be an old story. Things seemed about ready to break a week ago, but someone called for a pause.

Rumors in Washington, for what they're worth, still have the program starting early this month. The first group of orders is likely to be a big one. One guess: About $20 million. That's almost a quarter of the $84-million total.

. . . but Industry Buys

MEANWHILE, machine tool builders are pleased with present prosperity. In fact, as far as peacetime business is concerned, they never had it so good.

The first quarter showed a total of $185.25 million in new orders. That's an increase of almost 25 per cent over 1954's first-quarter figure of $148.6 million.

Continues — A group of builders told STEEL new orders in April will come close to March's. At that rate, it's certain to be the fifth consecutive month that new orders have topped $60 million. The National Machine Tool Builders' Association preliminary figure for March is $63.35 million.

Most builders seem to think the present level will continue through the year. One reason they feel secure: Orders are coming in from all industries. "When most of our business is wrapped up in one industry, we get nervous. The way it is now, we can expect that no one factor will cut into our dollar volume," builders explain.

Cutting Data

Machine tool builders may borrow a page from the producer of consumer goods and furnish machining data that will help the user get optimum output and performance. This information will augment operating instructions.

A. B. Albrecht, Monarch Machine Tool Co., Sidney, O., told guests at the American Society of Mechanical Engineers' spring meeting: "Much of the tabular-form machining data have become obsolete. There is a need for cutting data developed specifically for a given machine tool, so that all the features designed into that machine are utilized when it is set up for a production job."

Mr. Albrecht told STEEL the job is up to builders; his company already has this sort of a program under way. New machines are cut tested as they come off the line. When a customer buys one, he can be told the speeds, feeds, cutters, etc., he should use to get peak performance.

"Too frequently," Mr. Albrecht says, "old standards are adapted to a newly purchased machine tool. Naturally, such practice results in a loss of the available productivity designed into the machine. It is . . . useful to have on hand specific cutting data which can be used as a guide for establishing proper cutting speeds and feeds on all new equipment."

wanted: more

Management men are discovering the tremendous production gains and cost savings that result from uninterrupted operation of an entire stamping line. Since Danly Presses offer *maximum freedom from mechanical failure,* lines composed entirely of Danly Presses can produce more finished stampings per shift without work stoppage, without high maintenance costs in time and labor.

Danly Press lines actually turn out more finished stampings per hour, too. Danly Drawing Presses, pace-setters for the line, are designed with a special slide motion that doubles stroking rate without exceeding safe drawing speed. Output from these Danly Drawing Presses keeps the whole line working at full capacity.

Now—why are Danly Presses able to provide such remarkable advantages? For the most part, it's due to Danly's special design and heavier construction. Pressurized *oil* lubrication reduces maintenance by hundreds of hours every year. Heavier, more rugged construction meets day in and day out peak-load requirements. Danly's cool-running clutch and brake wear less . . . run longer before replacement. Simplified electrical and pneumatic control devices increase both operator and machine safety.

Because press downtime losses affect *your* entire production setup, it will pay to have a Danly Press engineer give you the complete story on how to lick this problem. Write or phone today.

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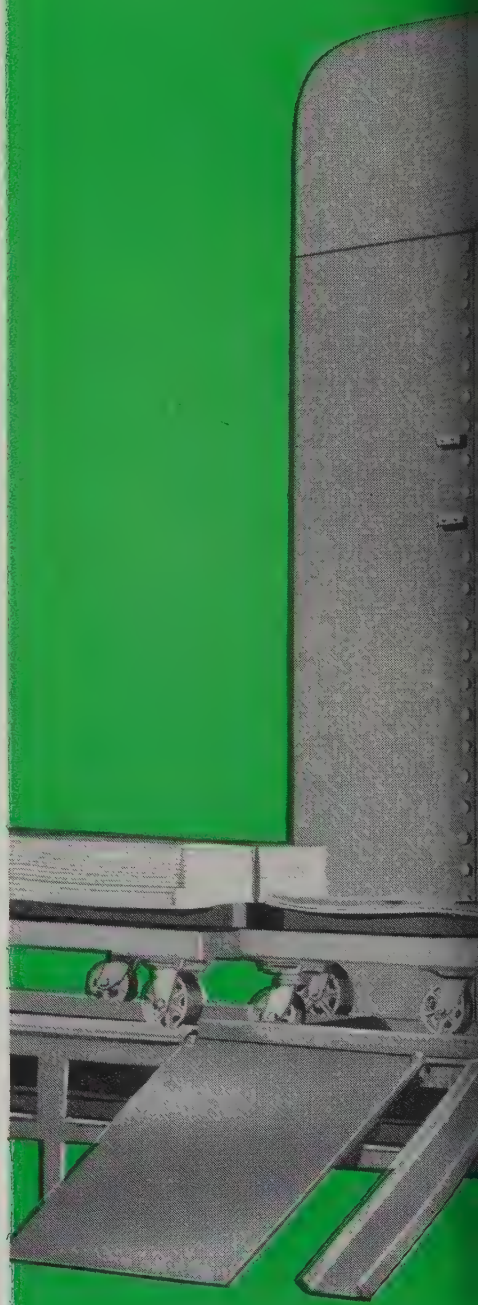
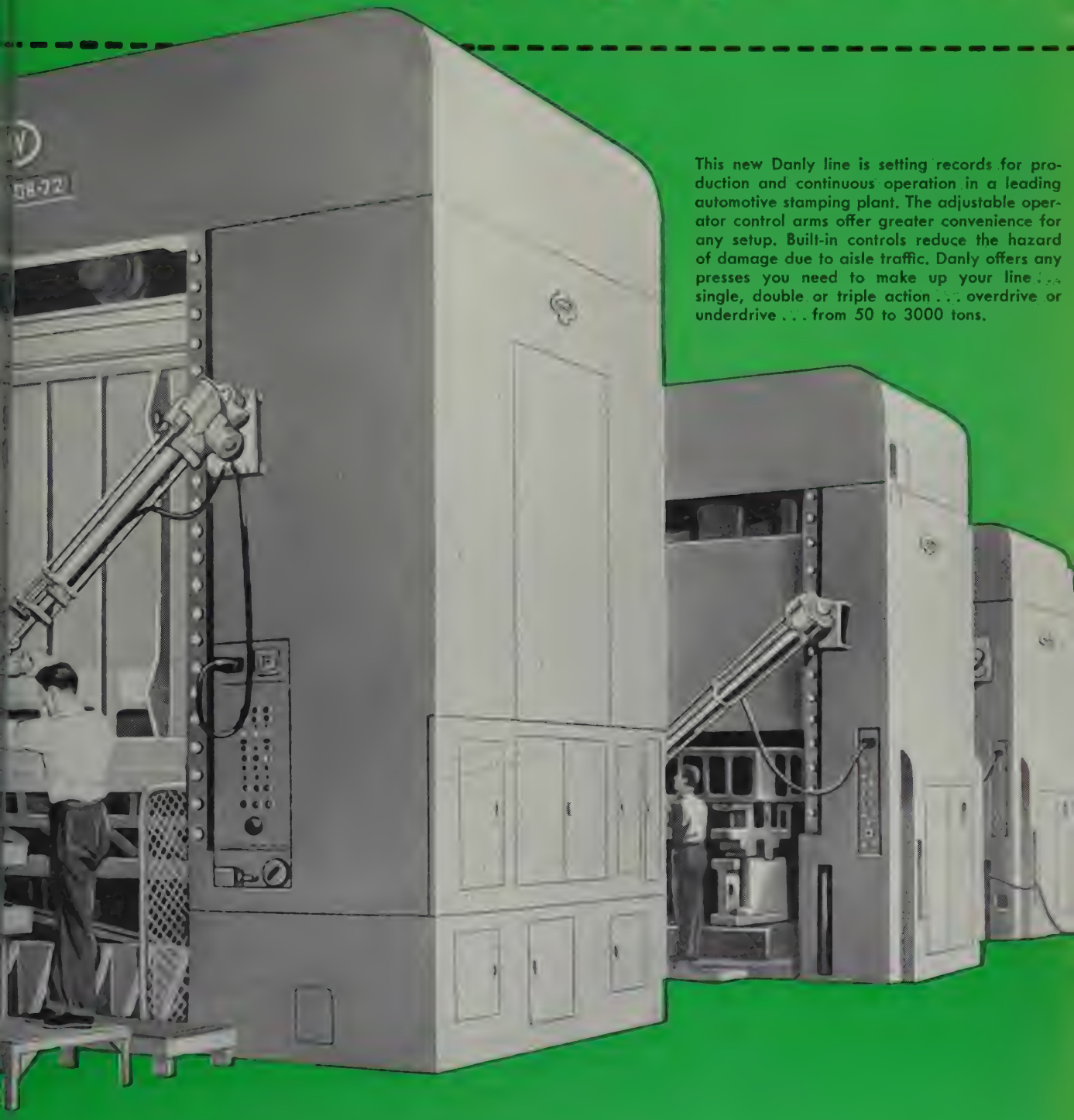
HYDRAULIC METALWORKING EQUIPMENT
MECHANICAL PRESSES . . . 50 TO 3000 TONS



It costs less to run a DANLY PRESS line!

specify: A NEW

inished stampings per shift



This new Danly line is setting records for production and continuous operation in a leading automotive stamping plant. The adjustable operator control arms offer greater convenience for any setup. Built-in controls reduce the hazard of damage due to aisle traffic. Danly offers any presses you need to make up your line . . . single, double or triple action . . . overdrive or underdrive . . . from 50 to 3000 tons.

DANLY PRESS LINE

THE MACHINE TOOL SHOW
CHICAGO, ILL.
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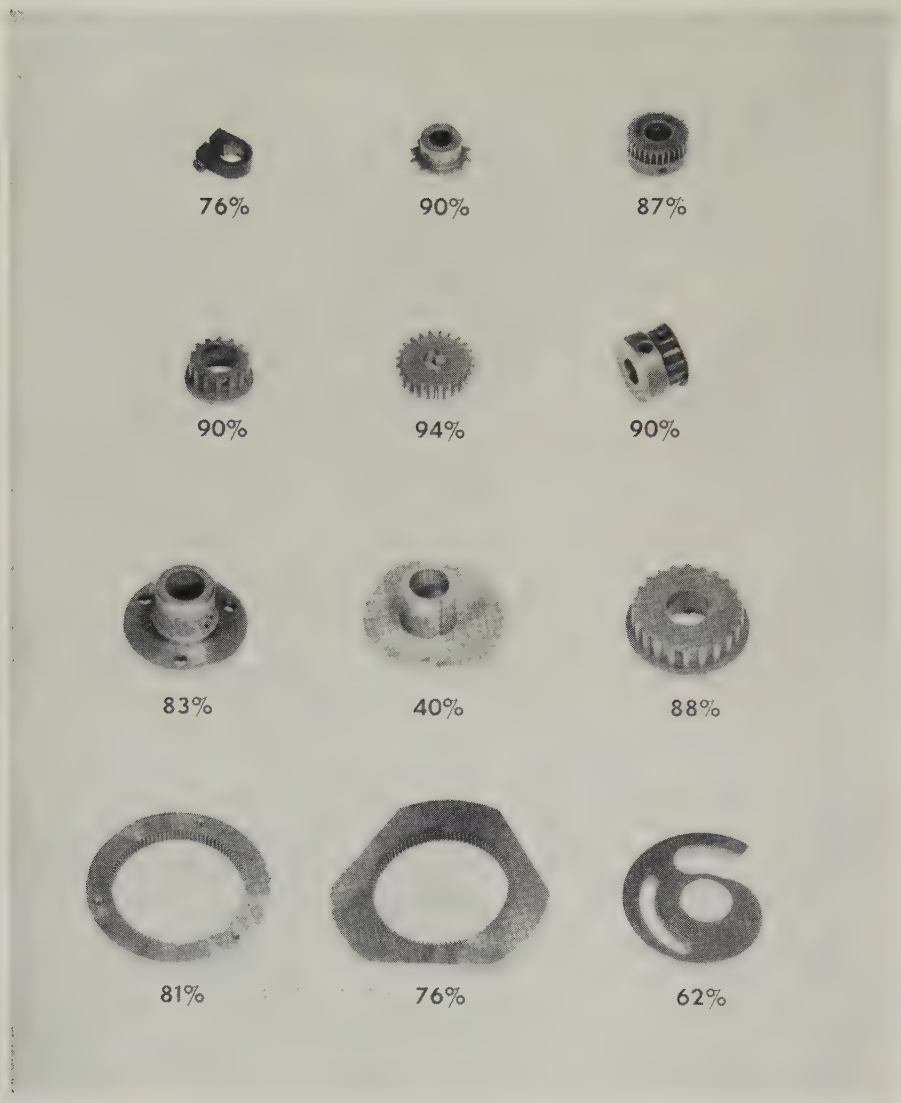


Percentage savings over cost of former methods show why . . .

Powder Metallurgy Gets the Nod

TEXTILE MACHINERY requires a vast variety of machined stampings, forgings and castings. Will powder metallurgy parts pay?

Whitin Machine Works, Whitinsville, Mass., seeks the answer through a series of conferences among its design, methods engineering, metallurgical and purchasing departments. They discuss quantities, specifications, finish and treatment before deciding on the feasibility of the proposed change. Behind this method of decision: 124 years of experience.

Green Light—If the decision is to go ahead, independent fabricators are called in to discuss specifications and determine if powder metallurgy can offer reasonable economies. This dual fact-finding system leaves little chance for a bad choice.

Sometimes the company decides to make its own dies for a powder part; sometimes the fabricator supplies them. In all cases the fabricator has the responsibility for storing and keeping dies in condition.

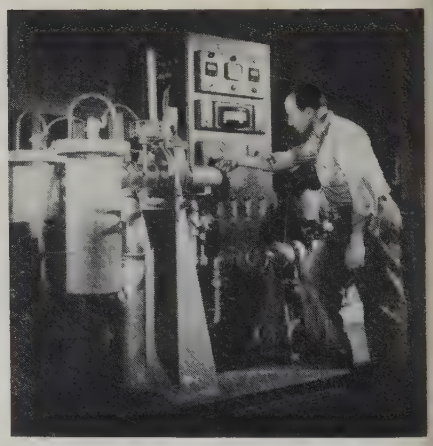
Following this procedure, Whitin has shifted to powder metallurgy on over 200 parts. Typical are those shown in the photograph. The parts are made for Whitin by Presmet Corp., Worcester, Mass. The iron powder is produced by Plastic Metals Division of the National Radiator Co., Johnstown, Pa.

Trapped Impurities Cut Away

Scientists at Westinghouse research laboratories are producing superpure titanium and other metals by imprisoning the molten metal inside a cage of its own making. It's called cage zone refining.

As a bar of titanium is melted progressively from end to end in an inert gas atmosphere, iron (a common impurity in the metal) tends to concentrate in the liquid titanium and remain there as the solid metal freezes out behind it. Each time the process is repeated, more iron is carried to the end of the bar, to further purify the rest of the titanium. Then the end is cut off and discarded.

This technique is particularly valuable for refining metals which are so active at high temperatures that they react with the crucible they are heated in. At its melting point (3000°F), titanium reacts chemically with air, metal, graphite or ceramic containers.



Vacuum Heat Treating Pays Its Way

This dual-retort vacuum furnace, built by F. J. Stokes Machine Co., Philadelphia, is used for precipitation hardening of Ni-Span C watch springs. Furnace paid for itself in ten months by giving better yield than could be obtained in a dry hydrogen atmosphere.

The Apr. 11 and 18 issues of STEEL carried articles on vacuum heat treating. A few extra copies are available in quantities of one to three until supply is exhausted. Write: Technical Editor, STEEL, Penton Bldg., Cleveland 13, O.

NO ROOM FOR RUST

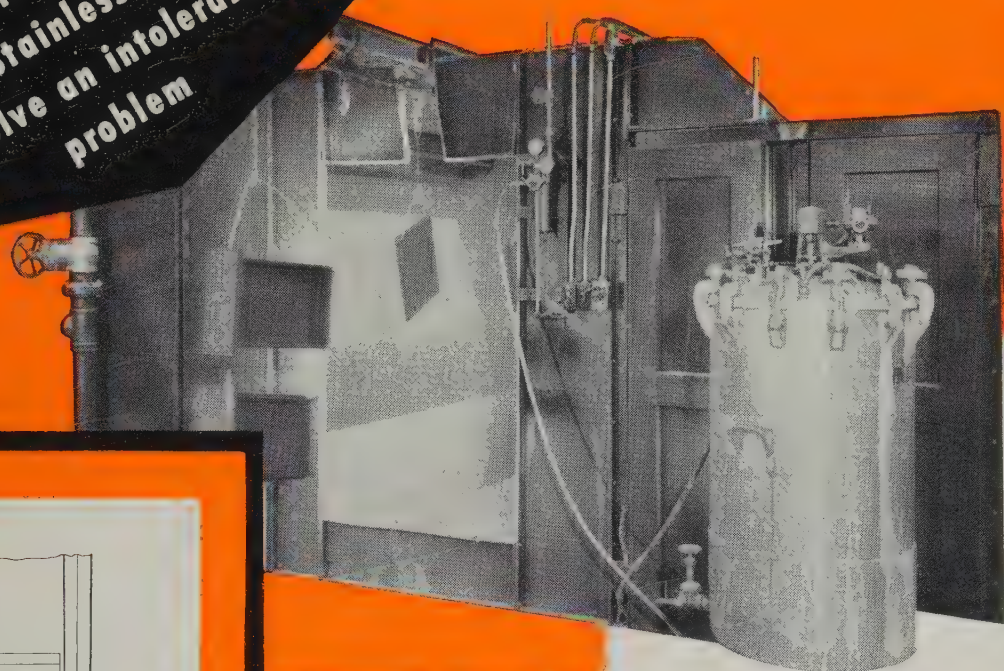
THE PROBLEM:

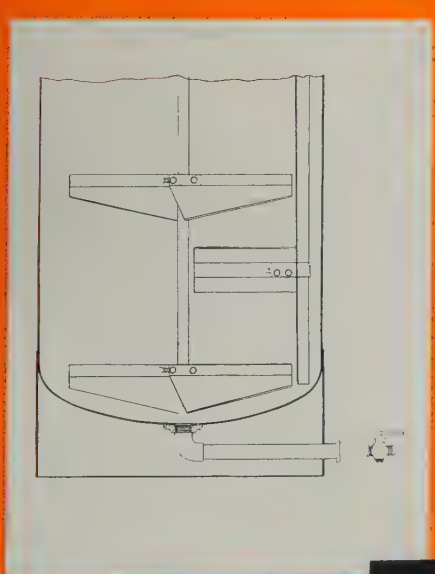
In supplying pressure material tanks for the application of vitreous enamel finishes, this manufacturer found that customers were having difficulty with rust spots which showed up only in the finished work and resulted in complete loss of every item affected.

THE SOLUTION:

An analysis of the problem revealed that rust discoloration was originating in the porous cast mixing paddles used to agitate the vitreous enamel in suspension. By incorporating stainless steel liners and fabricating the paddles from stainless steel sheet with a uniformly smooth surface, the source of the trouble was eliminated and with it, the problem of rejections.

Again . . . The HOUSE OF STAINLESS Provides the Stainless Steel to solve an intolerable problem





There may well be a place for stainless steel in your production picture, too.

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Photo, courtesy Binks Manufacturing Company, Chicago

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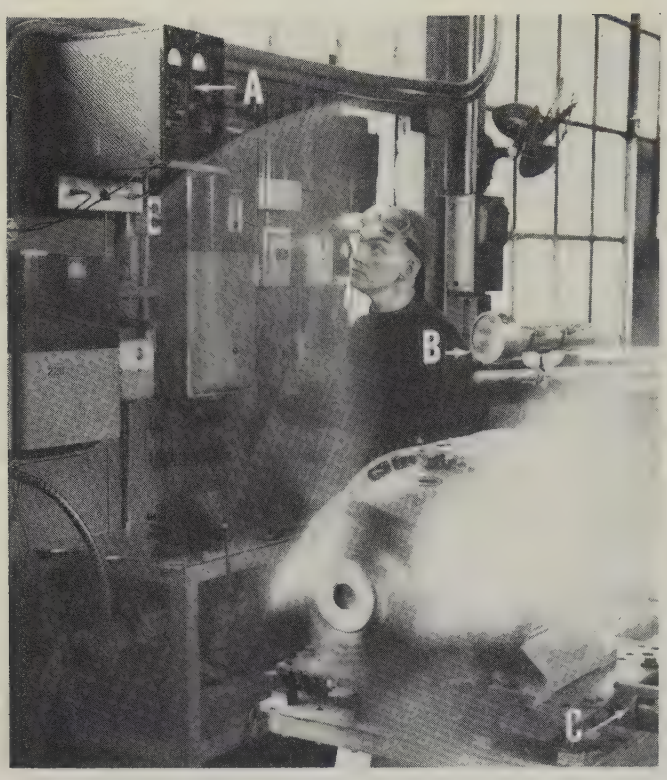


Seismic pickup (C) fires stroboscopic lamp (B) in synchronization with vibration of fan. Pickup also actuates circuits in the vibration analyzer (A)

With imbalance determined, operator grinds excess metal from heavy blades. Fan is brought within standard tolerance of vibration displacement in a few minutes

Electronic Balancing Speeds Fan Output

By ARTHUR R. CRAWFORD
President
International Research & Development Corp.
Columbus, O.

DYNAMIC BALANCE, a key factor in assembly of large industrial fans and their motors, is achieved electronically in a fraction of the usual time and at a fraction of usual costs.

An unbalanced fan is inefficient mechanically because much of its aerodynamic potential is dispersed in vibration. It can destroy its own mountings, burn out its motor, damage nearby fixtures or machinery and injure personnel as well.

Vibration created by imbalance in a fan can be transmitted by sympathetic resonance through floors, walls, girders, pipes or ducts of a building to affect machine operations elsewhere. In many cases, poor finishing by precision machinery, such as grinders, lathes and boring mills, has been traced to tramp vibration caused by unbalanced equipment elsewhere.

One Solution—To correct this, the H. H. Robertson Co., Pittsburgh, maker of industrial and commercial building materials, uses portable electronic balancing and vibration analysis equipment. Its aluminum industrial fans, which range up to 77 in. in diameter, are tested as assembled, operating units and dynamically balanced if necessary.

Various electrical connections on the balancing bench provide the proper voltage for each model. One set of controls makes it possible to stop the fans quickly by reversing current. Electric hoists place the fan and motor units on stands for balancing.

Procedure—Balancing equipment includes two, standard-model, IRD vibration analyzers, made by International Research & Development Corp., Columbus, O. This instrument's seismic pickup, capable of sensing vibration down to a millionth of an inch displacement, is mounted to detect any vibration in the fan or motorshafts, bearings or mountings.

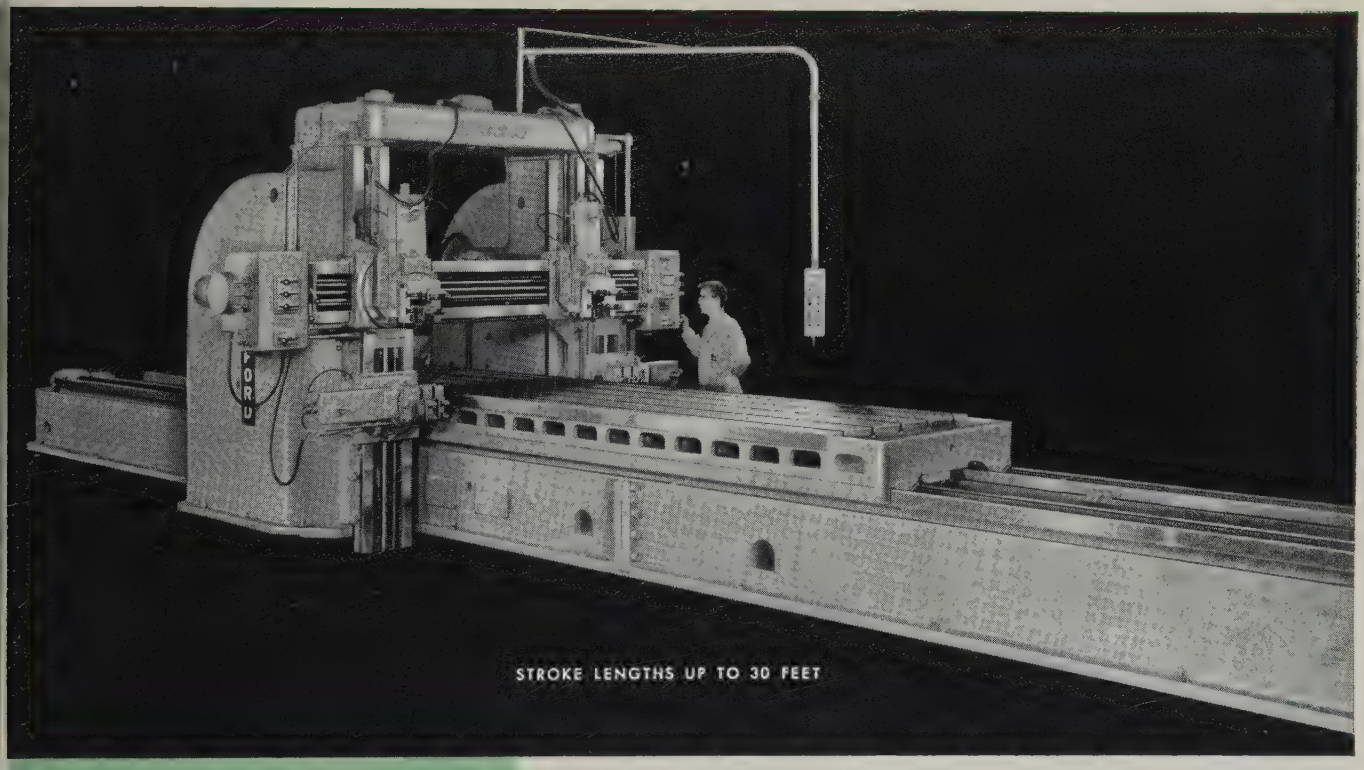
It fires a stroboscopic lamp, focused on the section being checked, in synchronization with the vibration. The current generated by the pickup also actuates the electronic displacement and frequency circuits in the cabinet of the vibration analyzer. Their information is transmitted to panel meters.

This process takes only a few minutes for each fan. After the amount and phase of imbalance have been determined, the operator grinds off excess metal from the heavy blade or blades with a hand grinder. When the fan has been brought within 0.001-in. tolerance, the operator releases it for shipping.

Benefits—This high-production procedure has cut balancing time two-thirds. Rejects have been cut to zero, and no customer complaints have been received. A four-to-one increase in the number of

fast, economical production calls for HYDRAULIC

hydraulic planers with exclusive triple circuit HYDRAULIC



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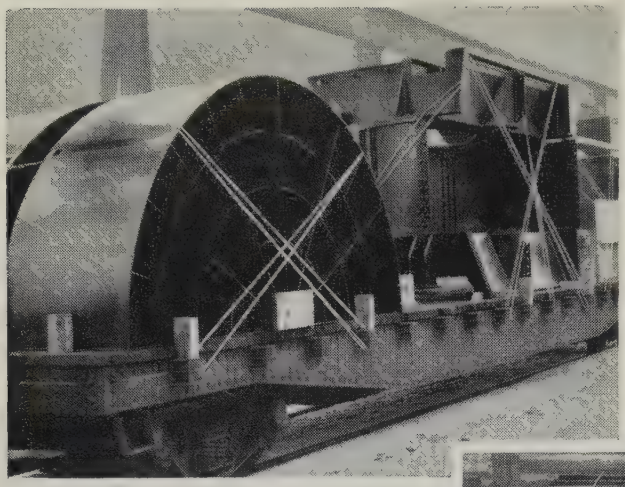
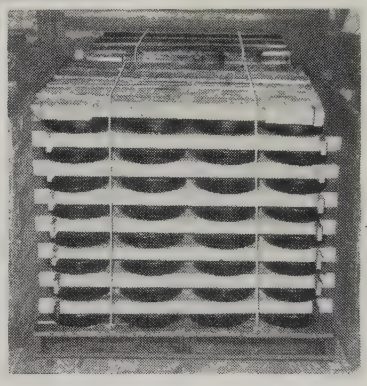


CARLOADS OF PRE-HEATING EQUIPMENT TO PALLETS OF BRAKE DRUMS



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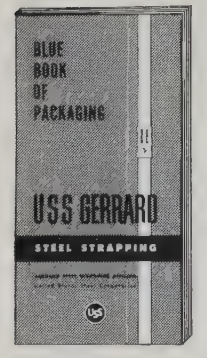

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fans made ready for shipment has been realized, and the average cost per unit of balancing has been halved.

In addition, four major changes in the fan assembly department resulted at least in part from data compiled in the balancing operation:

1. New cast patterns were made to place the center of gravity more exactly on the design center. 2. New boring jigs were made to reduce the time necessary to change from one size fan to another on boring operations. 3. A new grinding method for removing aluminum was worked out, cutting the grinding time from 1 hour to 3 minutes. 4. More stringent control was placed on foundry operations affecting composition of the fan stock to avoid hard-to-cut alloys.

Savings — A preliminary cost analysis of the new procedure and the changes in the fan assembly department point to savings which Robertson officials estimate might run as high as $10,000 a year.

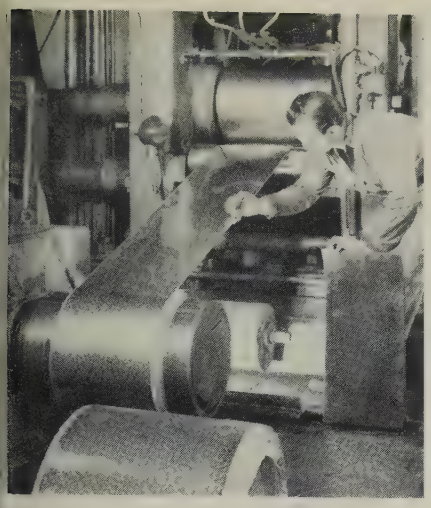
Dollar savings vary according to the model fan and the production volume. For example, the company found it had spent $42.50 in 1953 to balance each 77-in. fan. With the new process, the cost was about $4 the first month.

On 45-in. fans, the cost was cut from $11.36 to $3.42; on 40-in. fans, from $8.22 to $1.90. On large production models, such as the 34, 30, 28 and 23-in. fans, savings ranged from 15 cents to $2.39 each.

Field Uses—Because the equipment is portable and because it balances operating units, Robertson's technique is valuable for correcting imbalance on installed units where it would cause operational downtime to dimantle them.

The company balanced a 20-ft ventilating fan in a coal mine that was vibrating so badly its concrete piers were cracking, rivets were starting from the duct, the ground was shaking and ordinary conversation in the motor shack was impossible.

In a cement mill, IRD engineers worked out a procedure for balancing 7-ft, coal-mill fans in 5 to 10 minutes. With production of a sack of cement lost by each 15 seconds of downtime, time saved meant dollars earned.



Strip comes from mill with . . .

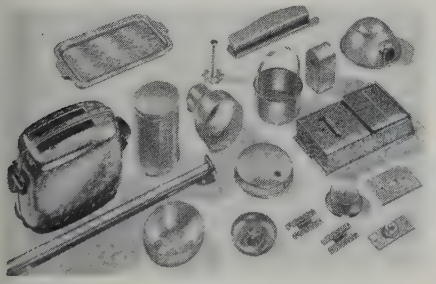
Rolled-In Design

PATTERNS are being rolled into cold-rolled strip steel in almost any design you can draw on a piece of paper. Developed primarily for decorative uses, this strip is gaining sales among fabricators of consumer products.

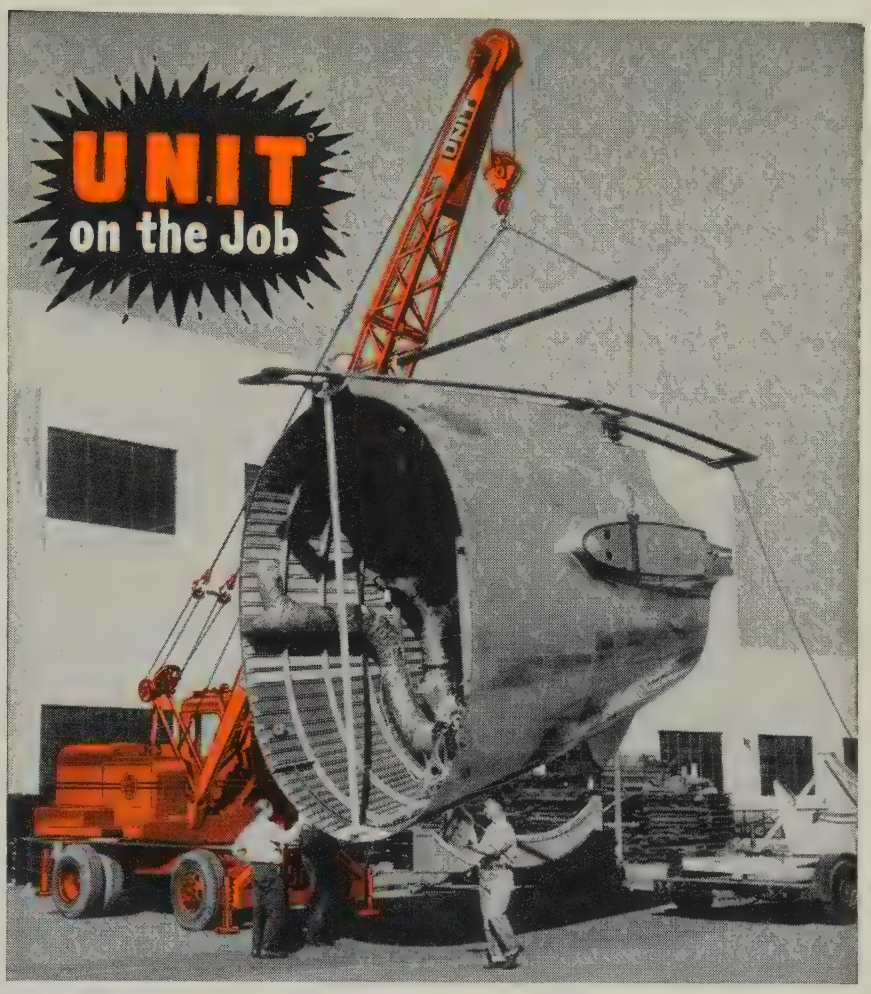
It offers manufacturers the appeal of more expensive metals at lower cost. It can reduce or eliminate plating costs and save on intermediate cleaning and buffing operations. It is easily fabricated and often lengthens die life by providing its own drawing lubricant.

Variety of Finishes—Patterned strip is produced at Thomas Strip Division, Pittsburgh Steel Co., Warren, O., in widths up to 18 in., in thicknesses from 0.010 to 0.125-in., depending on the pattern, and in the type of coating and finish required.

It can be supplied uncoated or electrolytically coated with copper, brass, nickel, chrome, zinc or lead alloy in natural, planished or buffed finishes. It can be hot-dip coated with lead alloy or tin, and lacquer coated, clear or colored.



Pattern-designed strip offers attractive finishes for variety of products



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the easy way

Typical of the powerful "pick-up" ability of UNIT Cranes is the above performance . . . loading a giant aerial "fish" or tail-stub assembly onto a truck trailer. Inside this huge stub, two jet-like gasoline heaters will be installed, with heating capacity comparable to that required to heat 12 six-room homes! UNIT torque drive provides full, steady, nonstalling power . . . greater lugging power . . . elimination of shock loads on machinery. It will pay you to investigate these and other UNIT advantages. Write for Bulletin L-302.

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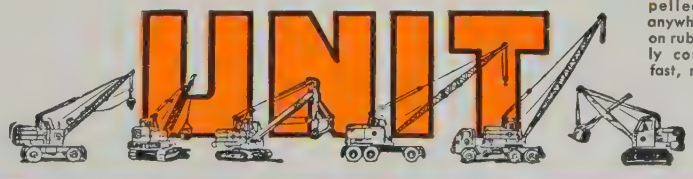

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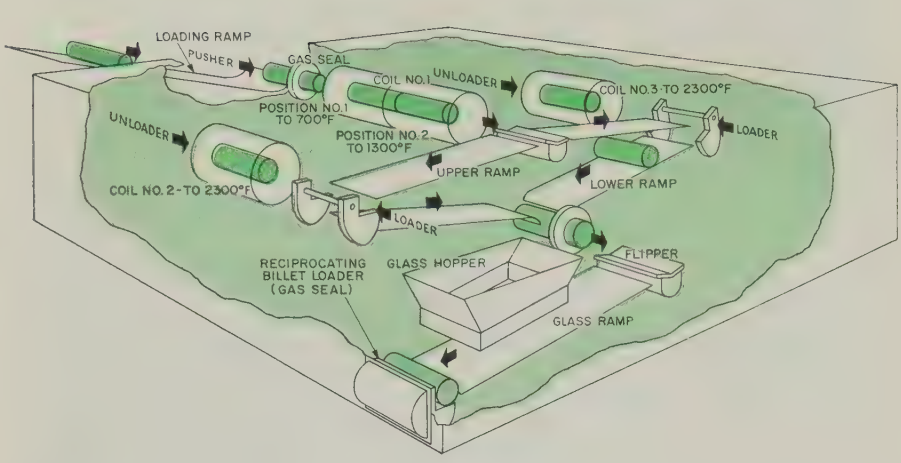

Induction heats carbon steel for hot extrusion at Jones & Laughlin Steel Corp.'s new $1,260,000 plant.

This 60-cycle Magnethermic furnace heats 50-lb billets to 2300°F. Here's how it works:

Billets are loaded cold onto the loading ramp. A pusher shoves a billet through a gas seal into the first stage of coil No. 1 where it is heated to 700°F. Then the pusher loads another billet behind it, and the first billet slides to the second position in coil No. 1 where it is heated to 1300°F.

As a third billet is loaded, the first billet is ejected to the flipper

HIGH
LOW
DUAL

Which Frequency Do You Choose?

INDUCTION HEATING for forging and extrusion came to stay in the early 1920s.

Today, the forger who wants to preheat by induction has his choice of low-frequency, high-frequency or dual-frequency equipment. Each has its particular advantages. He can buy equipment tailored to one job or versatile enough for many.

From it he can expect a host of good things — speed, economy, cleanliness, close control, adaptability, low metal loss, increased die life and attractive working conditions—provided he makes the right choice.

How to choose? That's the question three experts answered at a special session set up by the Industrial Heating Equipment Association at last fall's Metal Show, in Chicago.

High—There's a case to be made for high frequency, Frank T. Chesnut, Ajax Electrothermic Corp. engineer, said. He stated:

It would be foolish to use high frequency if low frequency would do the work as well. If the heating or conversion efficiency in the inductor is about the same, why introduce the extra loss, cost and liability for operation of a motor-generator set?

But conversion efficiency, on a comparable basis, is not the same. For example: Most induction heating applications for hot forming steel are of the high-frequency type for diameters up to 4 to 6 in. and 2 to 4 in. for nonferrous metals. There are, of course, many reasons:

Simplicity—With high frequency, the depth of penetration of induced energy can be shallow, insuring maximum power input for a relatively small number of ampere turns. Fewer inductor turns and less current make for a more efficient and simple inductor.

The inductor is made even more simple because substantially all high-frequency power sources are single phase. With a simple, single-phase inductor, a great deal more power can be crowded in a given space than with low-frequency or polyphase coils. Not only is heating more efficient, but end effect, motor effect and coil vibration do not have to be considered as major items.

ch sends it down a ramp to
er coil No. 2 or 3. The second
t out of coil No. 1 is directed
the flipper to the alternate coil
or 3). Coils No. 2 and 3 com-
e heating to 2300°F.

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he furnace will handle 4000 lb
4-to-5-in.-diameter billets each
r. Power is brought into the
ter at 2300 v and stepped down
furnace transformers to coil
tage. The entire heating cycle is
nducted in helium atmosphere.

Induction Heating—Some Basic Facts

Low frequency is commonly supplied over commercial power lines (60 cycles). High frequency is any higher frequency (61 cycles and up). The terminology is arbitrary, but generally accepted.

Induction heating equipment for hot forming, regardless of frequency, needs a power source, a heater unit or inductor, handling means and controls.

Power source may be a commercial power line, motor-generator set, vacuum-tube oscillator or spark-gap converter providing any frequency from 60 cycles to about 500 kilocycles.

The induction heating unit is a simple transformer winding placed in close proximity to the material to be heated. The inductor is the primary; the part being heated the secondary. Inductors can be made in a wide variety of shapes, sizes and types. They can be job tailored or versatile.

With induction, heating energy enters the load at the surface to a depth inversely dependent on the frequency, and is not affected by scale, color or surface condition of the load. Energy flows by thermal conduction from the surface to the center of the load.

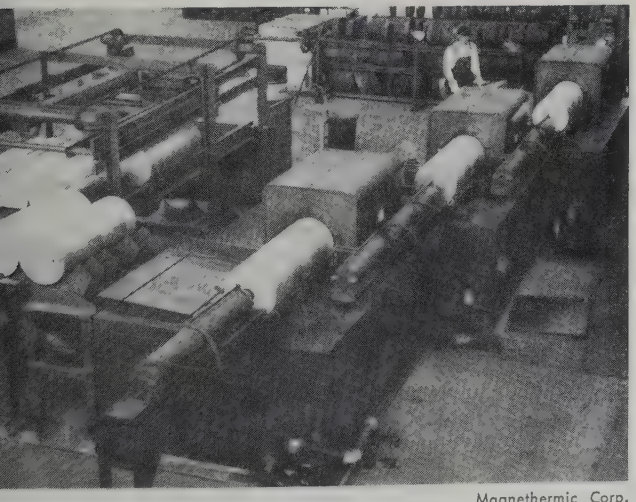
Flexibility—Not only are high-
equency inductors more flexible,
t high-frequency equipment as a
ole is more flexible than low-fre-
ency equipment. Well designed
gh-frequency equipment, once in-
lled, can be used for many low-
equency induction heating appli-
ions as well as, or better than,
-frequency equipment, and with
le change. It can also be used
broader applications, such as
lting, surface hardening and
at treating.

Low — But there's also a good case to be made for low-frequency induction heating, according to John A. Logan, president of Magnethermic Corp. He put it this way:

Sixty-cycle induction heating is not a tool that will replace other frequencies. It is not a cure-all for every application of hot working. Rather, it is a tool that will supplement high-frequency heating, enlarge mass heating possibilities (for example) in steel extrusion and rolling mills and make induction heating competitive with fuel-fired furnaces in applications where high-frequency heating is too costly.

Components—Fundamentally, 60-cycle induction heating is similar to high-frequency heating except that a frequency converter is not required. The actual heating utilizes the frequency generated by the utility, which is normally 60 cycles per second.

Basic components of the equipment are the heating coil, a power

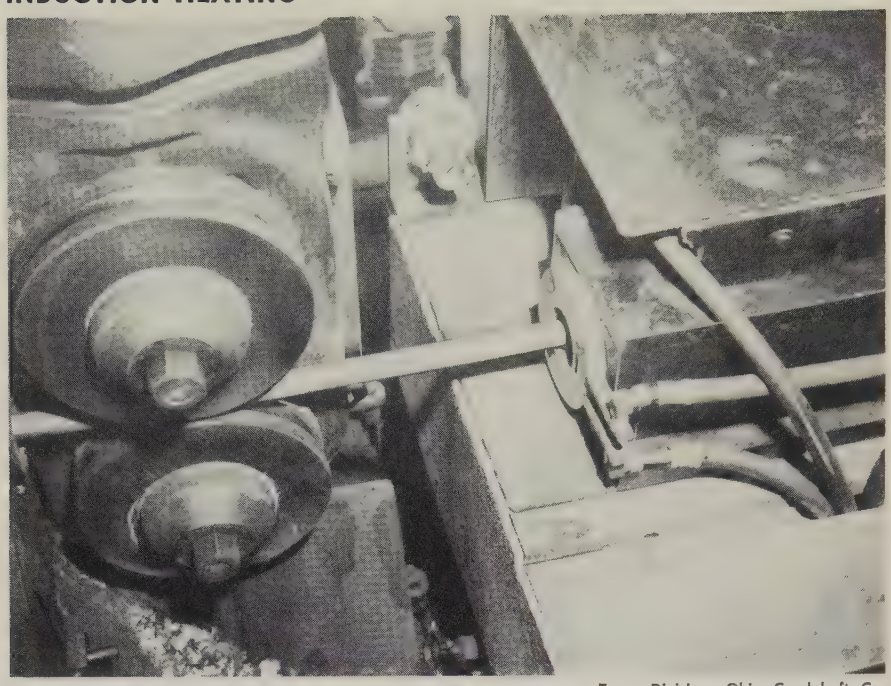


Magnethermic Corp.

speed and efficiency, induction heating can be per-
med in stages. These low-frequency units are heating
gnesium billets for an extrusion press

Ajax Electrothermic Corp.

Variety is the spice of induction heating. This battery of heaters will handle a wide variety of sizes and shapes of forging stock



Tocco Division, Ohio Crankshaft Co.

Induction heating is a natural for mechanical handling. Here bar stock is fed directly through the heater into a nut forging machine

supply usually consisting of a transformer, capacitors with a circuit-interrupting means and a temperature-controlling device.

Advantages — One of the most important advantages of low-frequency equipment is its initial cost. High-frequency induction generators vary in price from $60 to $100 per kw. This machinery is not needed in a low-frequency heater.

Sixty-cycle heating normally is limited to larger pieces. One other great advantage in through-heating large parts is the increased penetration with the lower frequencies, resulting in more rapid heating. For instance, on a 6-in. round the heating time with 60 cycles may be one-third of that with 3000 cycles for the same surface-to-center temperature differential.

Dual—But isn't there something to be gained by combining the advantages of both high and low-frequency heating? Carl P. Bernhardt, a Westinghouse Electric Corp. industrial sales manager, stated the case for dual-frequency heating this way:

Dual-frequency heating is the use, in combination, of two different frequencies to obtain the advantages normally inherent in both. Such an installation might use both high and low frequency, or two high frequencies, one in the upper and one in the lower range. It is not a new concept, although its wide use in production is recent.

Curie Point—When heating iron and steel by induction, a decrease in permeability on the order of 10 to 1 or more occurs at the Curie point, about 1400° F. As a result, the magnetic field goes deeper and the heated depth is greater above the Curie point—approximately 87 per cent of the total heating effect occurs in a ring around the periphery equal in thickness to the depth of current penetration. This is shown in the following table:

Table 1

Frequency	Current Penetration below Curie	above Curie
60	0.500 in.	2.60 in.
960	0.120	0.65
3,000	0.060	0.39
10,000	0.030	0.20
450,000	0.005	0.03

This means that, for best heating efficiency, as a general rule the diameter of the load should be six to eight times the current penetration depth. In some applications smaller ratios of diameter may be used at 60 cycles, where the user is willing to accept increased lower cost to obtain less expensive equipment.

Dual's Place—The following table shows the relation between diameter of workpiece and current frequency for heating of a typical steel for forging, based on a diameter 3½-times the depth of current penetration:

Table 2

Diameter*	Frequency in Cycles below Curie	above Curie
¼ to ½-in.	3000	450,000
½ to 1 in.	960	10,000
1 to 1½-in.	960	3000 to 10,000
1½ to 2 in.	60	3,000
2 to 6 in.	60	960
6 in. and over	60	60

* Rounds and round-cornered squares

While the table suggests that 60-cycle frequency is indicated for billets 6 in. and over, over-all economies of equipment cost and operating efficiency favor dual frequency heating for smaller sizes. For bars smaller than 1½-in., dual frequencies will not ordinarily be justified economically; it will be better to supply the total power from a single, high-frequency source.

Proof of Pudding — There you have three opinions, based on considerable experience. To see how facts fit with theory, let's take a look at some typical installations:

Nut Forging—At Lamson & Sessions Co., Cleveland, a completely automatic heater feeds a machine that makes 4300 nut blanks an hour. Stock is round steel bar up to 1½-in. in diameter.

The first two coils preheat the bar at 3000 cycles. The third coil at 10,000 cycles brings it to forging temperature, 2350 ± 25° F. This is dual-frequency heating, using two widely separated cycles both in the high-temperature range, a high-efficiency method for this type installation.

A special dividend is scale loss, reduced in this instance to about 1 per cent for hot-rolled stock.

Axle Spindles—Four, 960-cycle, inline heaters at the Ford Canton, O., plant can deliver a steel billet 2½-in. in diameter x 4 in. long every 5 seconds at a temperature of 2250° F. These billets—750 an hour — are extruded into axle spindles. A similar installation designed some years ago used dual frequency, but single high frequency proved more economical.

Drill Blanks—Sometimes induction heating has to handle a wide range of sizes. This is the case at

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...IN
COLD FINISHED
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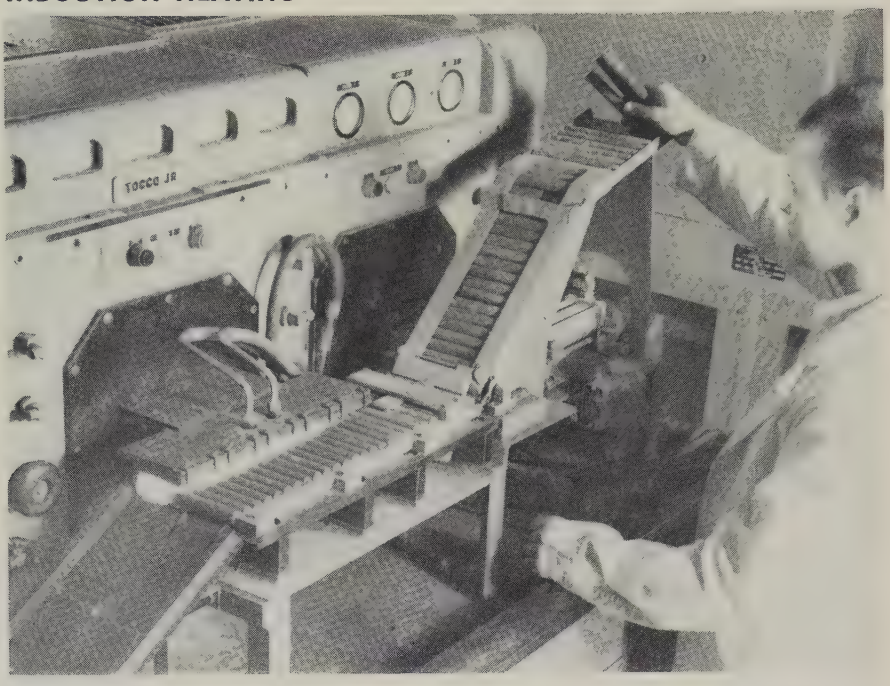


Selective heating is fast and easy with induction. Billets slide through this heater sideways, are heated only at one end

Cleveland Twist Drill Co., Cleveland, where two, 10,000-cycle generators feed a dozen or more induction heating units, each serving an individual forge. Some heat drill rod blanks and others heat preforged blanks for twisting.

The 10,000 cycle frequency was selected because it works almost equally well on the small and large-diameter pieces. Heating is so fast that an operator can hold the cold end of the blank in his gloved hand during the whole operation.

Mixed Forgings — Even greater versatility is required at the Massey-Harris forge, Racine, Wis., where bar stock from 1-to-4-in. square in a wide range of lengths must be heated for constantly changing jobs. A wide variety of heaters is kept on hand for different sizes and shapes of stock.

Three banks of seven heaters each operate at 3000 cycles. They are fed by a single generator through a common bus and any or all of the heaters in each bank may operate at once. Heaters are designed to heat all of the stock or only a selected portion as desired.

Shell Blanks—A 155-mm shell forging installation typical of the World War II period employed 960-cycle current for heating shell stock to 2300° F forging temperature. Stock was steel bar, 3 in. in diameter x 18 in. long. Heating time per bar took 4 minutes. The equipment was versatile enough to be converted to other forging and melting work after the war.

A more modern 105-mm shell installation just going into service uses dual frequency, 60 cycles below the Curie point and 960 cycles above. Billets 3½-in. x 8 in. pass through two low and two high-frequency coils at a rate of 480 an hour to reach 2150°F forging temperature.

In Process — When a piece requires reheating for subsequent forging operations, dual frequency may be in the picture as it is at a plant making 1000-lb bombs. The bomb shell is 14 in. in diameter, with a ½-in. wall thickness. Economical heating of 14½-in. of the bomb length, the first operation, is done at 60 cycles. Two subsequent operations, which require heating only about 8 in. up the bomb nose, are done at 960 cycles. The higher frequency provides flexibility for a switchover to smaller bombs at a later date.

Line Frequency—When the cross section of metal (either ferrous or nonferrous) to be heated rises much above 4 or 5 in., 60 cycles becomes the frequency of choice. Line current has been used for smaller cross sections, but the applications are limited. For example, units have been built utilizing 60 cycles to heat aluminum pieces 1⅜-in. in diameter and 3 in. long at extremely high production rates.

High frequency would have been more efficient, but the 60-cycle equipment was relatively inexpensive and gave greatest over-all economy because of low tonnages.

Big Billets—For heating billets about 6 to 8 in. in diameter, 60 cycles has plenty of precedent. One installation handles such steel billets 10 to 28 in. long, bringing them to 2300° F. Provision is made in the induction coils to cut out turns for shorter billets.

The most spectacular strides being made by low frequency today are in the heavy aluminum extrusion field. A recent installation for the Air Force Heavy Press Program handles billets 32 in. in diameter, 70 in. long. The coils are of vertical type and will bring billets to forging temperature in 35 minutes. Special controls have been devised to assure absolutely uniform heating. Before long we'll have inductors to handle 40-in.-diameter hollow billets.

Controls—This matter of controls is important: They can make or break the best equipment. The big problem is to provide sufficient flexibility without making the controls so complicated that they confuse the operator. The difficulty is most apparent when the heating unit must handle a wide variety of jobs.

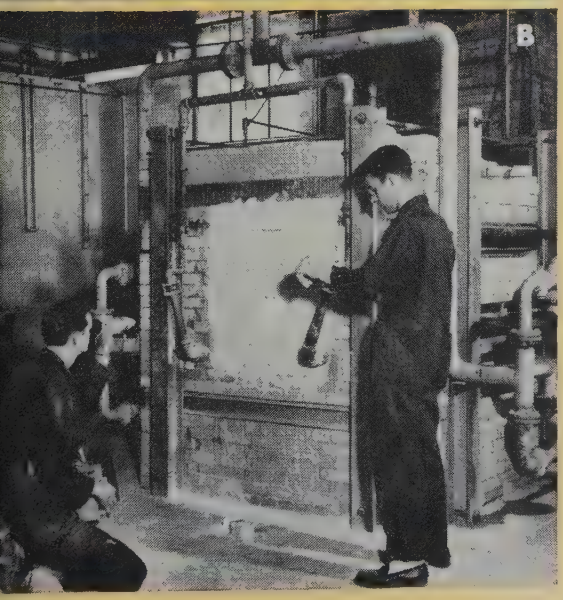
It should be apparent by now that the best induction heating installation is likely to be a compromise between economics and efficiency. It's one thing if you are going to be heating axleshafts of the same pattern day after day; quite another if your billet heater has to be converted soon for hardening gears.

That's why Mr. Chesnut, Mr. Logan and Mr. Bernhardt all emphasized the tremendous value of induction heating for forging and extrusion but added the caution: Look the field over with great care to get the equipment best suited to your needs.

For Your File

Extra copies of this article are available in quantities from one to three until supply is exhausted. Write: Technical Editor, STEEL, Penton Bldg., Cleveland 13, O.

NEW B&W 3200 degree Refractory Concrete



Today, in some types of heating and melting furnaces, complete linings or sections of linings are subjected to temperatures over 3000 F and, with the trend to higher and higher operating temperatures, the problem of finding the most economical refractories for this "over 3000 F service" will become even more important.

Now, with B&W's new Refractory Castable-3200, furnace builders and operators can cut installation costs by using castable construction for services up to 3200 F. As easy to use as other B&W refractory concretes, B&W Refractory Castable-3200 can be poured or trowelled into place or applied with a cement gun.

Several years ago, B&W developed Kaocast, the first successful 3000 degree refractory concrete, to lead this high temperature castable trend. B&W Castable-3200, like Kaocast, is made with an alumina-silica base and is recommended for temperatures from 2600 to 3200 F. Because of its very high temperature properties, it is not recommended for temperatures below 2600 F.

If you have not taken advantage of the fast, low cost installation of castables for your high temperature requirements, we suggest you investigate B&W Kaocast and the new B&W Castable-3200. Your local B&W Refractories Engineer has all the facts.

A Mixed like structural concrete, B&W Refractory Castable-3200 can be poured, trowelled or gunned into place. • **B** High temperature laboratory furnace lined with B&W Refractory Castable-3200.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars
OTHER B&W PRODUCTS: Stationary & Marine Boilers and Component Equipment
Chemical Recovery Units • Seamless & Welded Tubes • Pulverizers • Fuel Burning Equipment
Pressure Vessels • Alloy Castings

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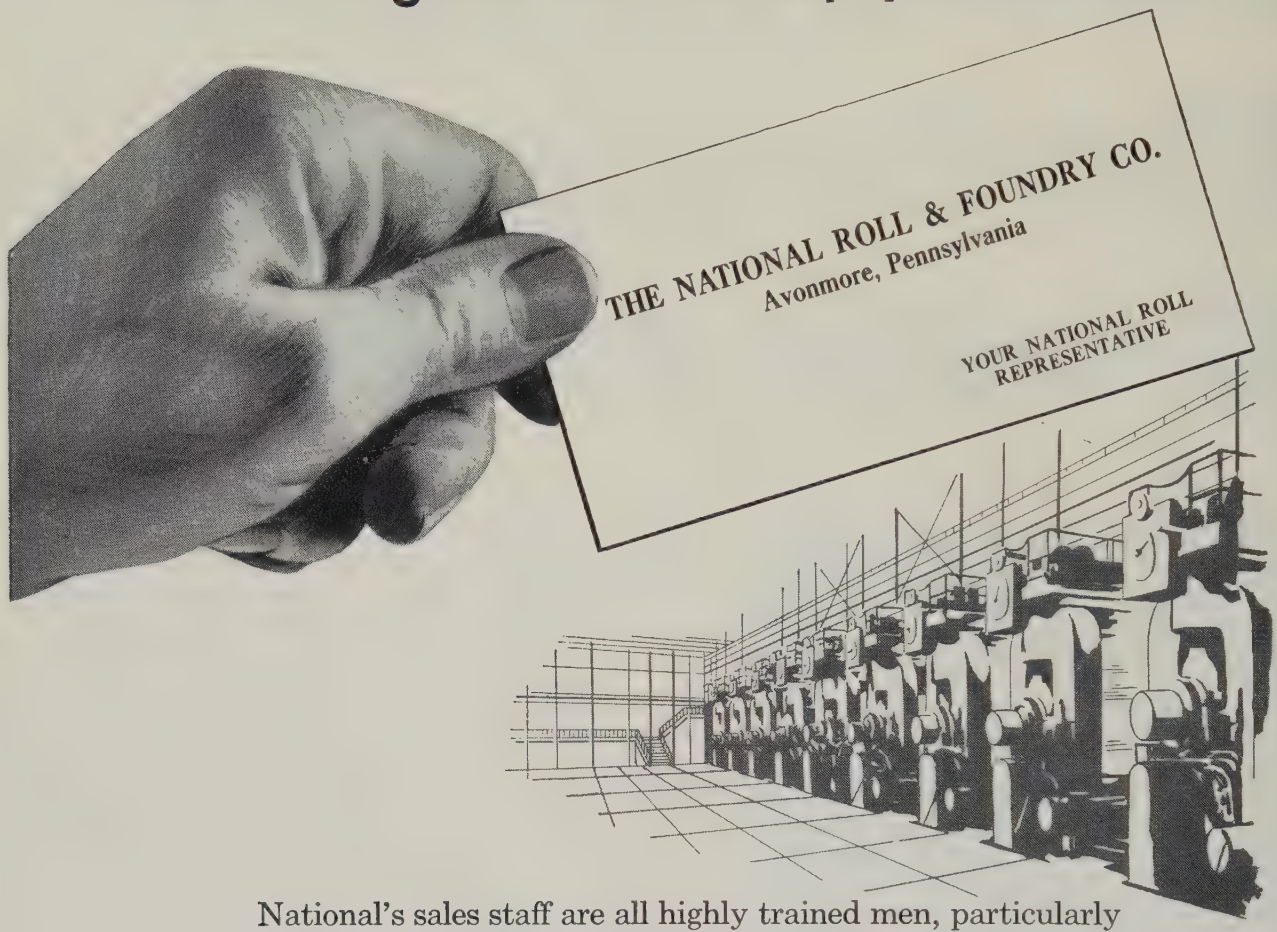
REFRACTORIES DIVISION
GENERAL OFFICES 161 EAST 42ND ST. NEW YORK 17 N.Y.
WORKS: AUGUSTA, GA.

R-530

Roll Problems?

Here's a good man to help you lick them



National's sales staff are all highly trained men, particularly experienced in steel production. A good deal of their time is spent in customers' plants analyzing production problems and advising the type of rolls and castings that will do each particular job most satisfactorily.

They are well aware of the many metallurgical and rolling problems that occur and are ready to help you find the solution.

. . . So the next time you run into a production problem, be sure to call on your National Roll representative—he is ready to serve you.

THE NATIONAL ROLL & FOUNDRY CO.

Avonmore, Pennsylvania

Specialists in Iron, Alloy Iron and Steel Rolls and Castings, Steel Armor Castings

NEW PRODUCTS and equipment

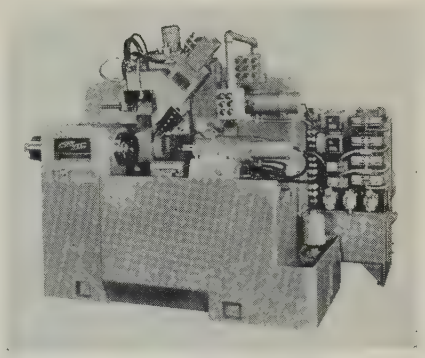
Write directly to the company for more information

Tracer Lathe

The HD-8 turns complex shapes and has the rigidity and power to take heavy cuts—thus reducing machining time. The tracer slide is on the top carriage of the Hydra-Feed lathe, lessening the possibility of chips, dirt, etc., getting onto the slide. An unobstructed front permits easy loading, unloading and checking of work.

The machine can be supplied with a constant or variable speed drive for the spindle. Also available: An auxiliary rear carriage for facing, grooving, chamfering and other types of cuts that can be handled by a straight plunge operation.

Either flat or round templates can be used. (The template can be made of relatively soft material, since the light pressure of the stylus results in little wear.) The lathe conforms to JIC hydraulic and electrical standards. Hydra-Feed Machine Tool Corp., 730 W. Eight Mile Rd., Ferndale, Mich. Lincoln 6-2828

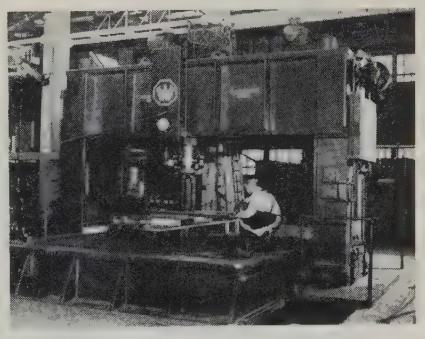


Hydraulic Straightening Press

The illustration shows an installation view of this 400-ton, vertical press. Its traveling gantry and traveling ram make it possible to straighten plates or weldments without moving the piece. Work can be loaded and unloaded easily since the gantry and carriage can be moved to the side of the bed.

The press is of welded-steel construction, with prestressed tierods. Control buttons are mounted on both housings. Paralleling racks, one on each side underneath the bed (20 x 13 ft), mesh with pinions on the cross shaft to maintain gantry alignment.

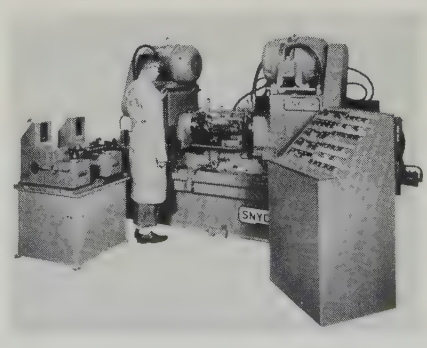
Maximum press stroke is 24 in. Crosstravel of the hydraulic ram is 10 ft 10 in. Longitudinal travel of the gantry is 15 ft. Ram speeds are: Ram down, 37 in. per minute; full pressure, 12 in. per minute. The ram carriage is powered by a 3-hp, 1200-rpm motor; the gantry by a 7½-hp, 1200-rpm motor. Ram carriage and gantry speed is 180 in. a minute. Williams-White & Co., Moline, Ill. Moline 2-3601

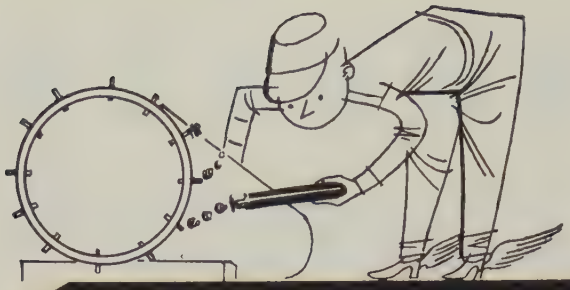


Precision Balancing Machine for Connecting Rods

This machine handles a variety of heavy-duty and diesel engine connecting rods from 7⅜ to 12½-in. center distance. It consists of a milling machine with two, opposed, double-spindle heads, a console containing all operating controls and a precision weighing unit. The amount of stock removal necessary to balance the rod is determined by the latter. Stock is then removed from each end of the rod on the milling machine by two sets of cutters.

The machine will balance a wide variety of heavy-duty connecting rods within the center distance capacity by changing a fixture and clamp detail. The weighing scale is individually calibrated to accommodate rods. The unit occupies a floor area 136⅞ x 121¼-in. It is 7 ft high. Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich. Lorain 7-0123

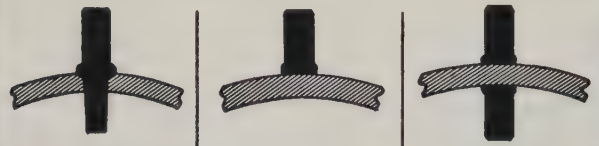




"STUD" NELSON
END WELDS
HEAT EXCHANGER FINS
IN A FLASH!

The trigger-quick NELWELD® system offers practical end welding for the attachment of low-cost pin fins on heat exchangers. The same system is used on pressure-tight vessels where attachments must be made without piercing the shell.

THREE METHODS OF INCREASING HEAT TRANSFER WITH NELSON STUDS



1. HOLE, TAPERED OR KNURLED PIN, AND STUD
2. STUD ONE SIDE ONLY
3. TWO ACCESSIBLE SIDES

The NELWELD system is quicker and stronger than hand welding . . . costs less because it saves time. It is a method that provides a continuous heat path for maximum heat transfer . . . offers a logical solution to the problem of interior fins . . . provides positive pressure-tight welds . . . a minimum of warpage.

Why not call your nearest Nelson field engineer? He's an expert at reducing cost, and he'll be glad to assist you in analyzing your stud welding needs. Write for further information.

Stud Nelson

Fasten it Better at Less Cost with

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NELSON STUD WELDING
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Please send more information on stud welding wood to steel, and other cost-saving applications.

NAME_____

COMPANY_____

ADDRESS_____

CITY AND STATE_____

NELSON STUD WELDING DIV OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

Press Helper Conveys Small Parts

Featured is a hydraulic ram adjustment at the discharge end for absolute accuracy of discharge height and automatic trap loading. This eliminates flipper-gates, prolongs the life of the belt and prevents clogging. Although designed for small parts (cleats on 6-in. maximum centers), it can be modified to accommodate larger parts.

The 675-J series is available in

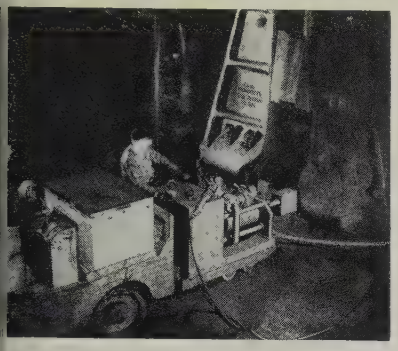
standard belt widths of 5, 8, 10 and 12 in. It has variable speeds from 30 to 90 fpm. An electric motor mounted on the upper end of the conveyor, with belt takeup on the lower end, drives the machine. There is ball bearing construction throughout. Portable mounting is available. Metzgar Conveyor Co., 409 Douglas St. N.W., Grand Rapids, Mich. Glendale 6-1751

Portable, Horizontal Hammer

It drives die and sow-block keys in forging hammers. Operating pneumatically with plant air, the Key Driver replaces hazardous methods of using a battering ram suspended from an overhead crane. It will deliver an accurate blow with the controlled force of an 800-lb steam hammer.

The hammer usually is handled

a fork-lift truck. Average key ving time is cut to 20 minutes.

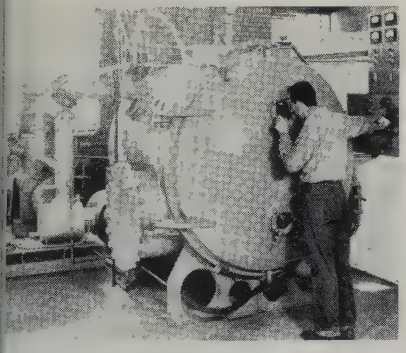


ly two men are needed to work hammer. Erie Foundry Co., ie, Pa. Erie 2-6754

acuum, Skull-Type c Furnace

This 50-lb, self-contained fur- ce, available with horizontal ell, is designed for development d small-scale production. It is rticularly suited for melting ti- nium, scrap recovery or produc- n of titanium castings.

The photograph shows the mod-

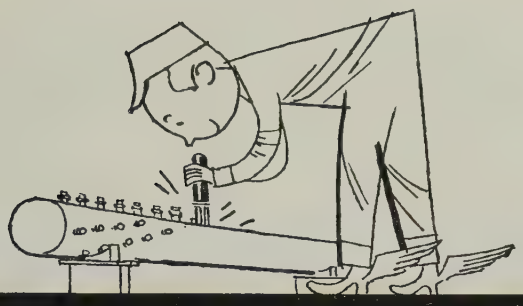


2705 in operation at National esearch Corp.'s metallurgical oratory. Naresco Equipment rp., 160 Charlemont St., New- n Highlands 61, Mass. Decatur 3300

ersatile, igh-Nickel Alloy

A tough, weldable alloy with echanical properties similar to ose of Inconel, Nionel resists rrosive attack in a large num- r of hot acids and mixtures of ids.

The relatively high nickel con- nt (approximately 40 per cent), us molybdenum and copper.

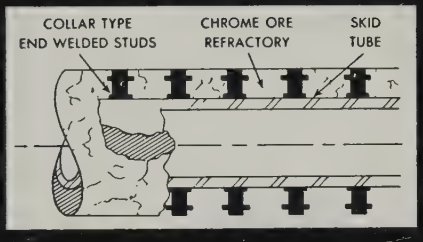


"STUD" NELSON END-WELDS

INSULATION STUDS IN A FLASH!

Encountering difficulty or high cost in securing or supporting insulation efficiently? If so, take a good look at the NELWELD® method.

NELSON® studs, end-welded in a split second, have solved hundreds of insulating problems for steel mills, all types of processing plants, and for manufacturers of boilers, heating and air conditioning equipment and tanks.



The NELSON collar stud, illustrated, is only one of many types that make insulating practical and profitable. Pins, hooks, rectangular studs, eye-bolts, split and slotted studs . . . fasteners for any kind of insulation . . . open up design possibilities without limit.

Your Nelson Field Engineer is a fastening expert, experience-trained to analyze your product designs at the blueprint stage . . . the point where remarkable savings can be realized. Write for details, indicating your problem.

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Fasten it Better at Less Cost with

NELWELD®

NELSON STUD WELDING
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Please send more information on securing insulation and other cost-saving NELWELD applications.

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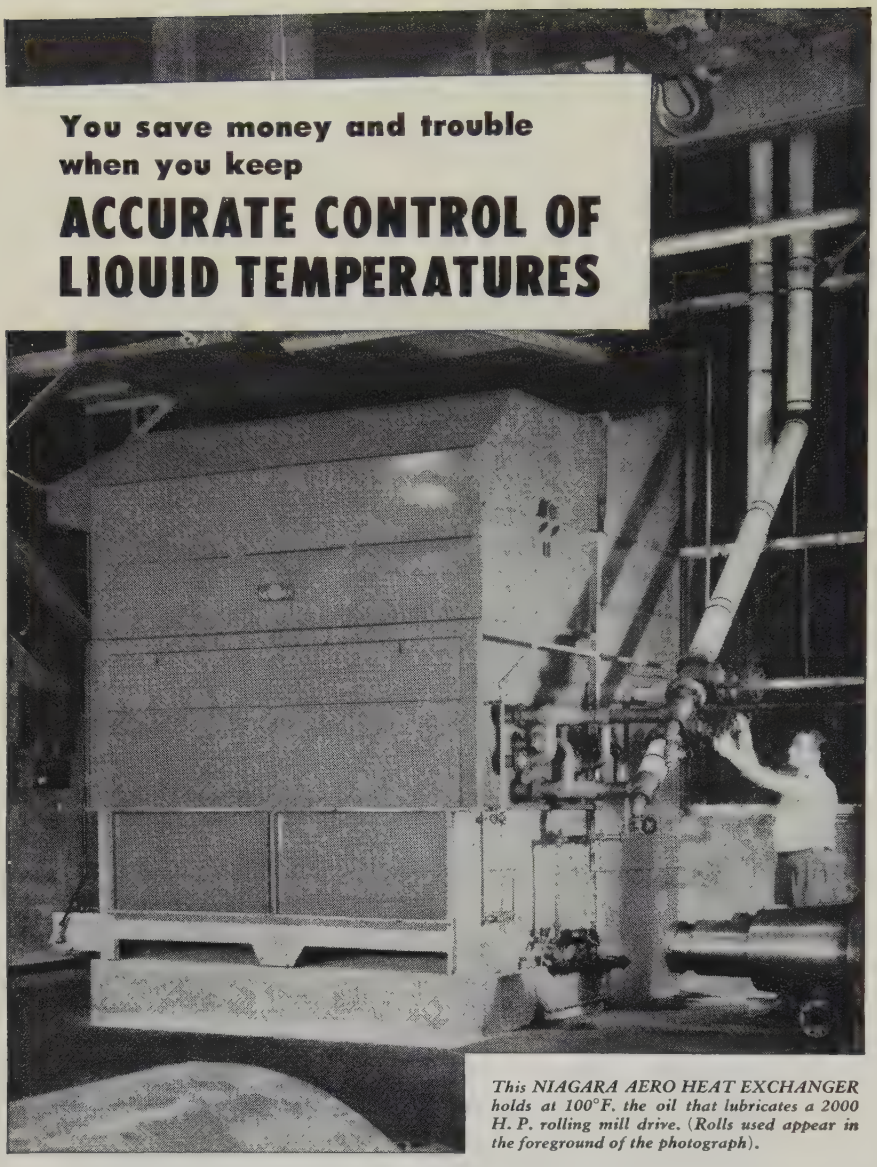
NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO



You save money and trouble when you keep

ACCURATE CONTROL OF LIQUID TEMPERATURES

This NIAGARA AERO HEAT EXCHANGER holds at 100°F. the oil that lubricates a 2000 H. P. rolling mill drive. (Rolls used appear in the foreground of the photograph).

The Niagara Aero Heat Exchanger uses atmospheric air to cool liquids and gases by evaporative cooling, removing the heat at the rate of input, controlling temperatures precisely. You save 95% of the cost of cooling water. You get great saving in piping, pumping and power, quickly getting back the cost of the installation.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You can cool welding machines, hydraulic and extrusion presses, plastic molds, furnaces, controlled atmospheres, quench baths, obtaining better results with precise temperature. You obtain closed system cooling, free from dirt or scale.

For further information, write for Bulletin No. 120

NIAGARA BLOWER COMPANY

Dept. S, 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of United States and Canada

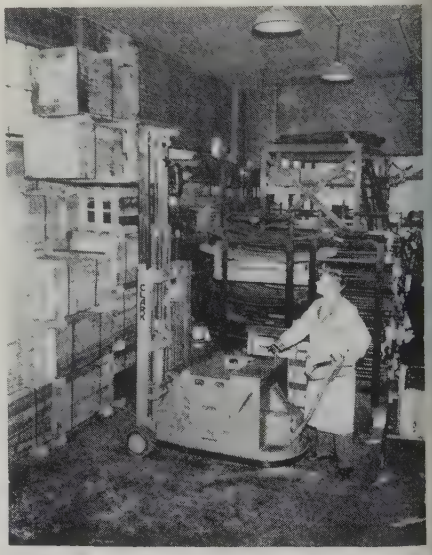
makes the alloy more resistant to hot sulphuric, sulphurous and phosphoric acid solutions. When the alloy's chromium content is fortified with nickel, it resists a variety of oxidizing chemicals.

In sulphuric acid, Nionel shows useful resistance to concentrations up to about 70 per cent at 176° F, a 40-per-cent concentration at boiling temperatures. It is expected that the alloy will find major applications in the sulphuric acid pickling of iron, steel and copper-base alloys, in petroleum refineries, synthetic detergent plants, rayon manufacture and ore processing plants.

Nionel is produced in all standard mill forms, including plate, rod, seamless condenser tubing, pipe and extruded tubing. International Nickel Co. Inc., 67 Wall St., New York 5, N. Y. Whitehall 4-1009

High-Stacking, Hand-Fork Trucks

The Hi-Lo Stacker line of battery-powered, tilting, fork-hand trucks (in 1500, 2000, 2500 and 3000-lb capacities with 24-in. load centers) has been added to this company's Powrworker series of hand trucks.



Equipped with telescopic-channel uprights, the fork truck provides a free lift of 64 in., with an 83-in. over-all height and maximum fork lift of 130 in.

The stackers can be equipped with single-lift (nontelescopic)

What's your shape?

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ckly and economically

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Now your complex sections can be *custom-made* at J&L's new Hot Extrusion Plant. On J&L's new equipment, they can be preformed to the predominating cross section of the part you wish to produce.

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STEEL CORPORATION — *Pittsburgh*

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- Eliminate time and costs in machining operations.
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insures prompt service in planning and production by experienced engineers who know industry's problems. Our numerous sales and service centers keep in constant touch throughout all phases of the work.

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This booklet covers the scope of CONTINENTAL Service. It is well illustrated with views of CONTINENTAL installations with descriptions of the equipment and the processes performed.

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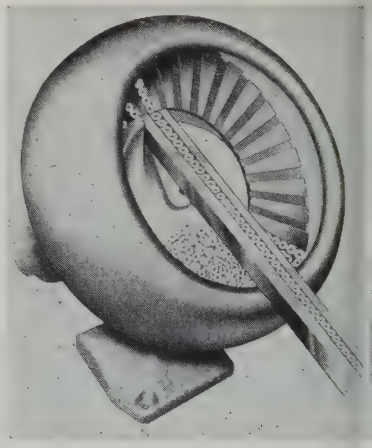
channels which have an over- height of 83 in., and provide maximum lift of 66½-in. For hig way truck loading, the single-l model is available with a 68-i over-all height as standard (ma imum lift of 51½-in.).

A double-acting cylinder, whi supports the upright channels a load at any tilted position, p vides a 10-degree backward t and 3-degree forward tilt. A heav duty, electric motor, with precisio built gear pump, provides pow for hoisting and tilting through oil hydraulic system. Clark Equ ment Co., Powrworker Section, dustrial Truck Div., Battle Cre Mich. Woodward 3-6513

Rotary Hopper Parts Feeder Speeds Productio

It is designed to provide acc rate, high-speed parts delivery presses, grinders, special machin and machine tools. It also can used for sorting, counting and spection.

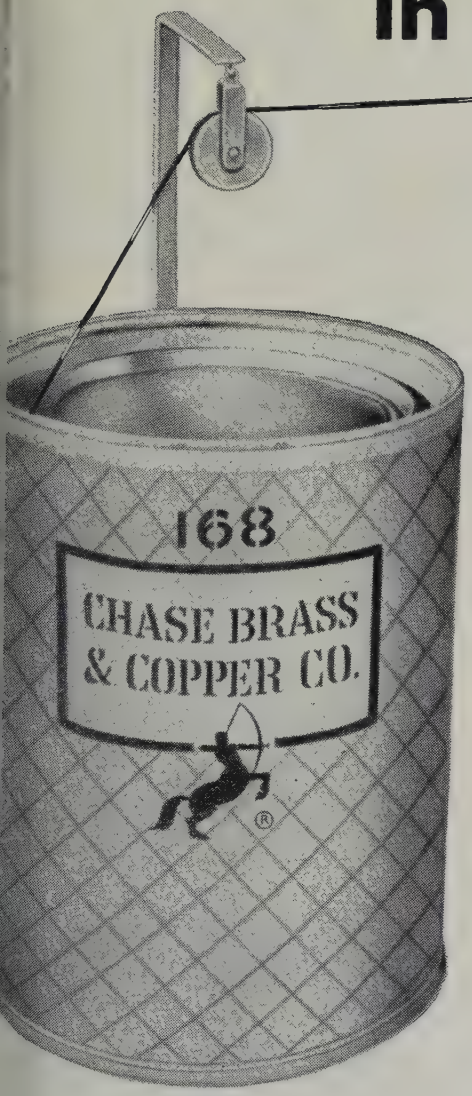
A fully enclosed, continuous-du motor has a slip clutch for ov loads, which is easily accessi for adjustment. Mounted on ba bearing shafts, 12-pitch gears a



used throughout. All gears a bearings operate in an oil ba The rotary hopper incorporates three-point mounting in the b for easy installation on rough uneven surfaces. The unit its it fully adjustable to assure best feeding angle. The hopper be supplied with four feeding rad Feedmatic Inc., 22515 Telegr Rd., Detroit 19, Mich. Flan 1-4656

CUT

Wire forming costs with CHASE® WIRE in new *Payoffpaks*!

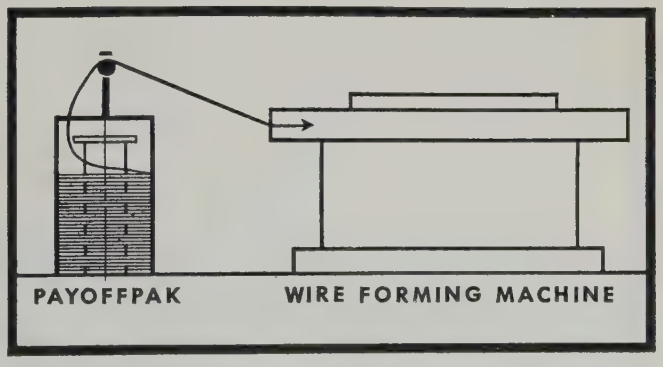


Now, in this compact, easy-to-handle PAYOFFPAK you can get a continuous length of Chase copper alloy wire weighing 400 to 500 pounds!

This new Payoffpak puts an end to frequent set-up of wire-forming machines . . . means *more* continuous, economical operation, *less* costly down time!

You'll like the easy way this Payoffpak handles, the space-saving way it stores . . . and the way it protects the shining surface of Chase copper alloy wire from rough handling in transit and storage.

Ask your Chase Wholesaler or nearest Chase Warehouse about the new Payoffpak the next time you order copper alloy wire.



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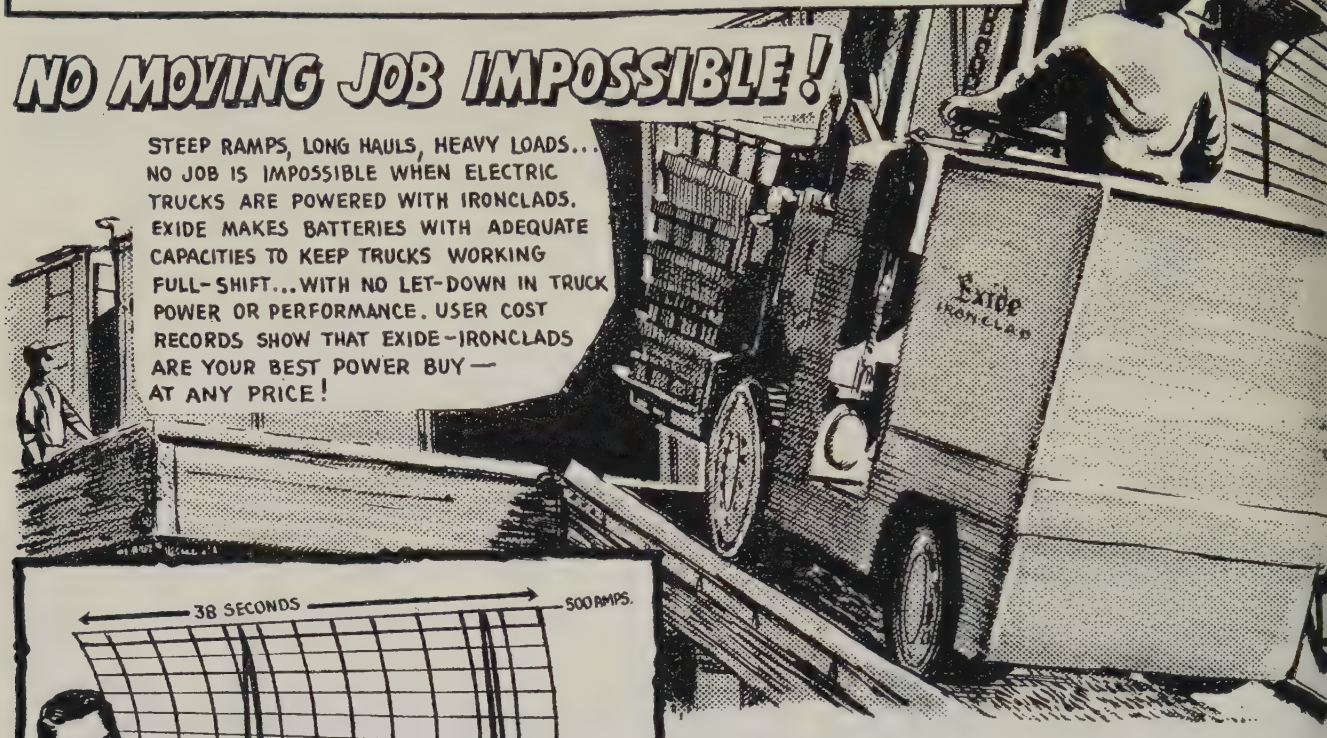
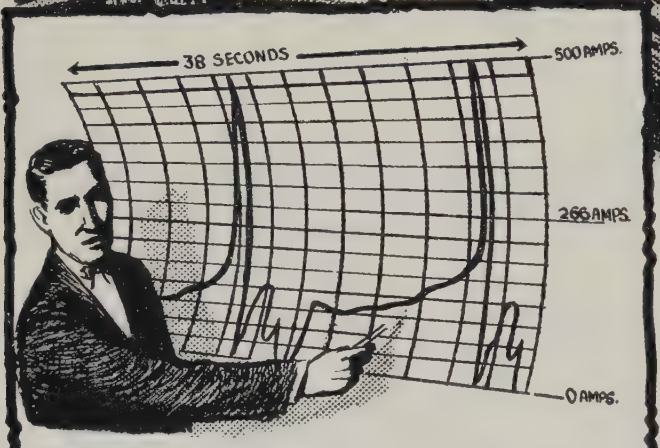
NO MOVING JOB IMPOSSIBLE!

STEEP RAMPS, LONG HAULS, HEAVY LOADS... NO JOB IS IMPOSSIBLE WHEN ELECTRIC TRUCKS ARE POWERED WITH IRONCLADS. EXIDE MAKES BATTERIES WITH ADEQUATE CAPACITIES TO KEEP TRUCKS WORKING FULL-SHIFT...WITH NO LET-DOWN IN TRUCK POWER OR PERFORMANCE. USER COST RECORDS SHOW THAT EXIDE-IRONCLADS ARE YOUR BEST POWER BUY— AT ANY PRICE!



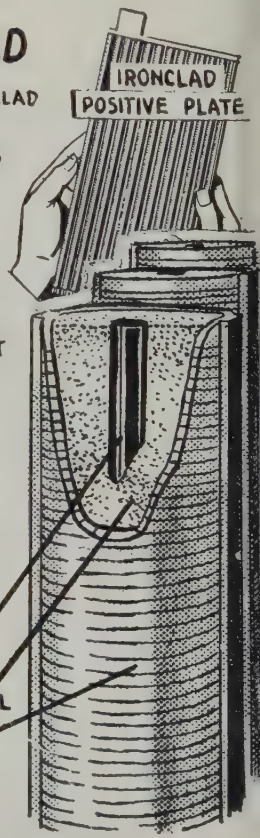


PORTRAIT OF AN EXIDE WORKING

IN JUST TWO MOVES AND 38 SECONDS A FORK TRUCK MAY DRAW ENERGY FROM ITS BATTERY IN THIS PATTERN, IN RESPONSE TO 44 SEPARATE CONTROLLER OPERATIONS. IN AN 8-HOUR SHIFT, 3000 SUCH DEMANDS MAY BE MADE. EXIDE-IRONCLADS ASSURE RAPID, ACCURATE HANDLING OF MATERIAL... THEY RESPOND INSTANTLY TO THESE RAPIDLY RECURRING DEMANDS FOR HIGH POWER FOR SHORT DURATIONS.

TUBES OF POWER WORK FOR YOU INSIDE AN IRONCLAD

SLOTTED TUBES INSIDE AN IRONCLAD KEEP ACTIVE MATERIAL IN FIRM CONTACT WITH CONDUCTING GRIDS OF THE POSITIVE PLATE...THIS GRID PROTECTION LENGHTENS THE LIFE OF THE BATTERY. SLOTTED TUBES EXPOSE MORE ACTIVE MATERIAL TO THE ELECTROLYTE... FOR GREATER POWER. FINE TUBE SLOTS HOLD MATERIAL IN CONTACT WITH GRID LONGER...RESULT, THE IRONCLAD'S ABILITY TO DO YOUR MATERIALS MOVING JOB FOR A LONGER PERIOD OF TIME. THAT IS WHY EXIDE-IRONCLADS ARE YOUR BEST INDUSTRIAL TRUCK BATTERY BUY— AT ANY PRICE!



LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS. ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES.

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

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Multipurpose, Sintered Carbide

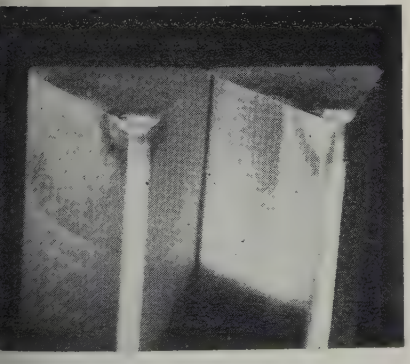
K21 is designed for general cutting, heavy roughing and finishing of steels. It has a hardness of A 91.5 and high transverse rupture strength.

The material is shown cutting an

eccentric shaft, 1 in. off center. t is used by this shop for general-purpose steel cutting and for oughing and finishing. This interrupted cut of 7/16-in. per side s with a feed of 0.015-in. The first ut is at 310 fpm, the second at 60 fpm. Length of the cut is 13¾-n.

Characteristics of K21 are high-dge strength, good wear qualities nd resistance to cratering. It is articularly effective on plunge nd interrupted cutting of castings aving sand inclusions and hard pots. It also has demonstrated ood performance on lighter cuts.

The material is stocked by the ompany in blanks, tools and inerts.



In the photo above, K21 is shown t the left, K2S at the right. Each f the inserts produced 134 pieces nder identical conditions. K21 hows less edge wear and the abence of chipping. Kennametal Inc., atrobe, Pa. Latrobe 2200

a special message for appliance manufacturers
need a finish that blocks corrosion by itself—or under paint?
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- **ON MAGNESIUM** Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

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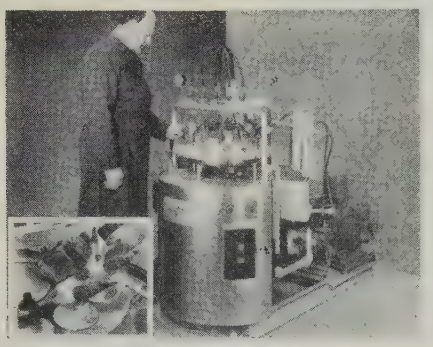
Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals, ARP Plating Chemicals
WEST COAST LICENSEE: E. H. Sutton Co.

Packaged, Automatic Brazing

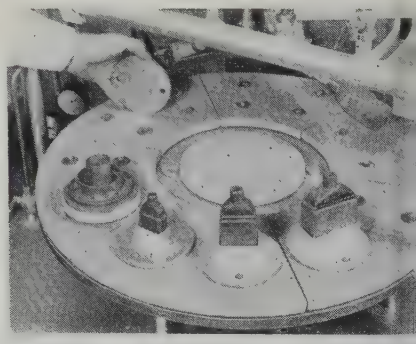


This gas-fired unit is shipped complete with all necessary equipment for brazing small and medium-sized assemblies. It uses combustion control and automatic timing to produce brazed joints of uniform quality at high speed.

All equipment is mounted on a structural steel frame. A combustion controller delivers the fuel/air mixture at a predetermined ratio and pressure. Adjustable burners provide the optimum heat pattern and heating rate. Permanent or replaceable fixtures support the work components. A dial-type, work table carries the assembly past the burners in continuous or intermittent motion. Automatic timers, pneumatic indexing equipment and electric motors are also included. Provision may be made for specialized functions, such as automatic feed and delivery, air or water-controlled cooling. Installation requires only standard connections to fuel gas, compressed air and electric source.

Although the unit is designed for general brazing operations, each machine is engineered to meet a range of jobs as specified by the user. Details of design are based on laboratory research, and each machine is tested in operation before shipment.

The machine shown indexes parts past Superheat burners to braze burner and similar Selas assemblies. Fixtures for different work assemblies are easily replaced. All burners are adjustable to accommodate a variety of assembly shapes and each can be turned off individually without affecting the operation of the others. Varying heat requirements may be met by adjustment of the electric timer.

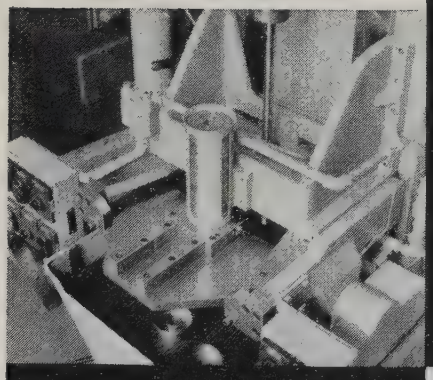


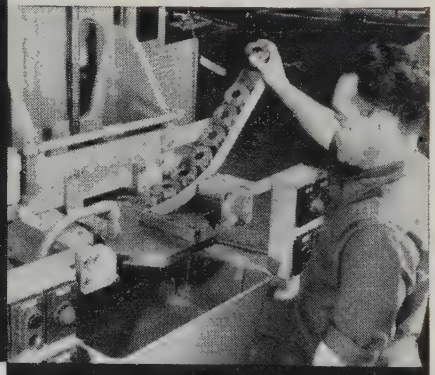
In the photo above, the fixtures needed for brazing assemblies of four sizes and shapes are shown. Pin-and-hole mounting provides accurate positioning and quick changeover. Simple fixtures hold parts to be brazed on the turntable of the machine. Selas Corp. of America, Philadelphia 34, Pa. Garfield 6-7600

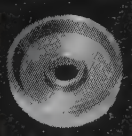
automatic broaching can be low cost broaching the *American* way

The broaching operation can justify automatic set-ups on smaller volume jobs when the tooling is kept relatively simple and the cost low. Illustrated here are two American machines which feature:

1. Automatic cycle
2. Simple tooling
3. Magazine or chute feed







This American vertical pull-up (VP) machine broaches the hub and spline of an automotive clutch hub. A hydraulic slide interlocked to the automatic machine cycle shuttles parts from the tube magazine into broaching position. The parts are broached and then ejected below. The slide automatically moves back during the broaching stroke and reloads a part. Production is over 300 parts per hour.

Here an American VP broaches the I.D. of a sun gear converter part for an automotive transmission. The inclined gravity chute feeds parts into the positioning fixture on the hydraulic slide. Production is over 300 parts per hour. Both machines will run continuously on automatic cycle. The operator only has to keep the magazines filled with parts.

Why not let American help you solve your broaching problems. Just send a blueprint or sample for a free estimate. American makes a complete line of broaches, broaching machines and fixtures. For further information on American VP internal broaching write for Catalog No. 401.

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New Literature

Write directly to the company for a copy

Stainless Steels

"The Joining of Crucible Rezistal Stainless Steels" details 17 methods of joining stainless steel by fusion. It also describes eight flame and arc-cutting procedures commonly used—24 pages. Crucible Steel Co. of America, Box 88, Pittsburgh 30, Pa.

Enclosed Motor

Here are details on the Type-H, enclosed motor. Cutaway photos illustrate its various construction features—Booklet 1856, 12 pages. U. S. Electrical Motors Inc., Box 1058, Los Angeles 54, Calif.

Torque Converter

If your power plant (gasoline or diesel) falls within the 40 to 275-hp output range, you may want to check the Chrysler industrial converter detailed here—4 pages. Chrysler Marine & Industrial Engine Corp., subsidiary, Chrysler Corp., Trenton, Mich.

Chemical Flocculant

Lytron 886—it removes suspended solids from foundry wash waters — is effective in concentrations as small as two parts per million. This brochure covers the properties of the clarifier and recommends techniques for its use — 16 pages. Monsanto Chemical Co., Dept. SF, Springfield, Mass.

Carbide-Tipped Tools

"How To Braze, How To Grind, How To Inspect Carbide Tipped Tools" is written in specific, easy-to-understand terms. Tables of specifications and clearly drawn diagrams will enable anyone to produce carbide-tipped tools which function perfectly—4 pages. Adamas Carbide Corp., Dept. A-39, Kenilworth, N. J.

Vitreous Enamel Finishing

Here's a how-to brochure on the application of vitreous enamel to aluminum castings. Results of tests and the advantages of this colorful and abrasion-resistant, protection coating are given. Technical data for design engineers provide a preliminary basis for investigating product application — Vitreous Engineering, Monarch Aluminum Mfg. Co., 9210 Detroit Ave., Cleveland 2, O.

NEW BOOKS

Better Tool Cribs, William Raisglid, the Industrial Press, 93 Worth St., New York 13, N. Y., 1955. 152 pages, $4.

Guide on how to lay out a tool crib for efficient handling and storage of tools and materials and how to set up an adequate tool control system.

Dimensions and Tolerances for Mass Production, Earle Buckingham, the Industrial Press, 93 Worth St., New York 13, N. Y., 1955. 164 pages, $8.

Analyzes problems of dimensioning with tolerances for mass production, showing their effect on tool design, gage design, production and inspection.

Front Line Cost Administration, W. C. Cooling, Conover-Mast Publications Inc., Book Div., 205 E. 42nd St., New York 17, N. Y., 1955. 260 pages, $5.

A factual approach to industrial engineering methods, it explains and promotes the use of cost administration tactics to the foreman and supervisor.

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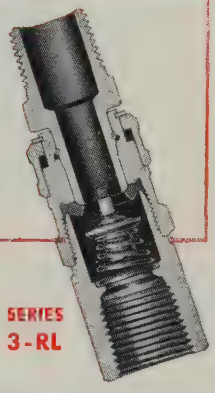

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- All Series 3-RL Sockets and Plugs are interchangeable — reduces stock inventory to a minimum.
- One-way shut-off—for pneumatic service applications.
- Positive locking.
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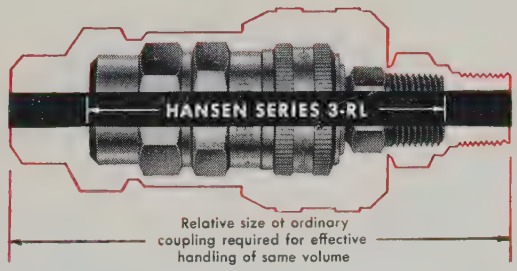

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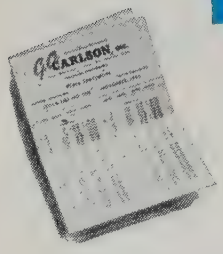

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District Sales Offices in Principal Cities

Market Outlook

IF steel ingot output goes any higher, it will set a new tonnage record.

Production of 2,317,000 net tons of steel for ingots and castings in the week just ended (May 1) about equaled the record of 2,324,000 tons made in the week ended Mar. 29, 1953 (during the Korean War). This shows there can be high steel output without a shooting war.

In producing 2,317,000 tons of steel, the industry operated at 96 per cent of capacity. In the preceding two weeks, the rate was 95.5 per cent.

NEAR THE TOP—Current output is not likely to go much higher. There have been times when the steel industry has run at more than 100 per cent of rated capacity, but those were war times—and capacity was not so great as it is now. Without the spur of war, the industry is not inclined to run that high. To exceed its present level of 96 per cent of capacity, the industry would have to use some of its older and less efficient stand-by facilities and otherwise resort to costly practices.

WATCHING FOR CLUE—Before it will be willing to go much higher, the steel industry will have to be convinced high demand is here to stay for a long time. It isn't convinced of this. It wants to see what happens to automotive demand.

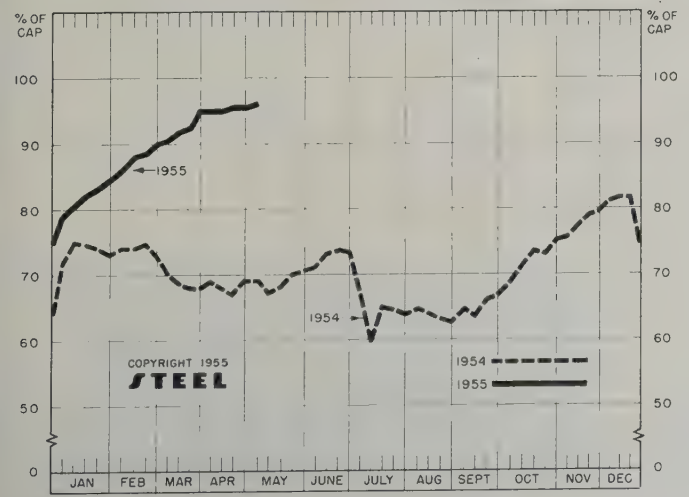
SURPRISE—Earlier in the year it was commonly thought the auto industry would make a big production push in the first half, drop off during the summer and then revive somewhat with new models late in the year. But the auto industry has been a big surprise. Automakers don't see that expected dip. Auto sales have kept right up with production. In turn, production has been trying to keep up with sales. A new record for auto and truck output in the U. S. was set in the week ended Apr. 23. Vehicles were rolling out at an annual rate of 11 million. Hardly anyone expects that rate to hold continuously. In the best year we ever had (1950), 8 million vehicles were turned out.

VARIATIONS—The steel business is not tight everywhere. Mills are feeling heavier demand than warehouses, which distribute one-fifth of the steel made. All forms of steel are not experiencing the same amount of demand: In strongest demand are light, flat-rolled products.

BROAD SUPPORT—If the automobile industry slows only moderately, the over-all demand for steel could remain high, for many other businesses are doing well. The machine tool industry received a larger volume of orders in March than in any month since September, 1953. This trend is in line with plans of businessmen to spend more for new plant and equipment this year than in 1954. Expenditures for new plant are helping push up construction, the second largest user of steel. Dollar volume of heavy construction is running 10 per cent ahead of record 1953.

CONTRAST—In contrast with the high rate of steel production is the price of scrap that goes into steel. The price continues downward, lowering STEEL's composite on steelmaking grades from $36.08 to $36 a gross ton. The decline stems in part from a seasonally increased flow of scrap and from continued high usage of pig iron by steelmakers.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended May 1	Change	Same Week 1954	Same Week 1953
Pittsburgh	99.5	+ 1	70.5	97
Chicago	99.5	+ 0.5	78	106.5
Mid-Atlantic	96.5	+ 0.5	56	97.5
Youngstown	96	0	70	106
Wheeling	95.5	+ 1.5	86	101
Cleveland	97.5	0	77.5	102.5
Buffalo	104.5	0	67.5	106.5
Birmingham	93.5	+ 3.5	56.5	102
New England	90	+ 6	60	86
Cincinnati	92.5	+ 1.5	60.5	97.5
St. Louis	98	— 8	72.5	92
Detroit	92	+ 1	60.5	109
Western	91	- 5	84	110
National Rate	96	+ 0.5	69	100.5

INGOT PRODUCTION‡

	Week Ended May 1	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	144.2†	142.2	141.8	101.9
NET TONS (In thousands)	2,316	2,284	2,278	1,637

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 57

Technical Outlook—p. 105

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Apr. 26 1955	Apr. 19 1955	Month Ago	Apr. Average
(1947-1949=100)	144.7	144.7	144.7	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.525	Sheets, Electrical	$9.350
Rails, Light, 40 lb	5.917	Strip, C.R., Carbon	7.493
Tie Plates	5.275	Strip, C.R., Stainless, 430 (lb)	0.415
Axles, Railway	7.500	Strip, H.R., Carbon	5.113
Wheels, Freight Car, 33 in. (per wheel)	48.500	Pipe, Black, Buttweld (100 ft)	15.000
Plates, Carbon	4.675	Pipe, Galv., Buttweld (100 ft)	18.605
Structural Shapes	4.517	Pipe, Line (100 ft)	146.804
Bars, Tool Steel, Carbon (lb)	0.430	Casing, Oil Well, Carbon (100 ft)	154.216
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.525	Casing, Oil Well, Alloy (100 ft)	227.875
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115	Tubes, Boiler (100 ft)	‡
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.610	Tubing, Mechanical, Carbon	‡
Bars, H.R., Alloy	8.875	Tubing, Mechanical, Stainless, 304 (100 ft)	161.193
Bars, H.R., Stainless, 303 (lb)	0.423	Tin Plate, Hot-dipped, 1.25 lb	8.533
Bars, H.R., Carbon	5.000	Tin Plate, Electrolytic, 0.25 lb	7.233
Bars, Reinforcing	4.963	Black Plate, Canmaking Quality	6.333
Bars, C.F., Carbon	8.160	Wire, Drawn, Carbon	7.938
Bars, C.F., Alloy	11.375	Wire, Drawn, Stainless, 430 (lb)	0.545
Bars, C.F., Stainless, 302 (lb)	0.438	Bale Ties (bundle)	5.860
Sheets, H.R., Carbon	4.870	Nails, Wire, 8d Common	7.815
Sheets, C.R., Carbon	5.864	Wire, Barbed (80-rod spool)	7.127
Sheets, Galvanized	7.220	Woven Wire Fence (20-rod roll)	16.925
Sheets, C.R., Stainless, 302 (lb)	0.553		

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 27 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 avg.=100)	194.53	194.53	194.53	189.74	156.13
Index in cents per lb	5.270	5.270	5.270	5.140	4.230

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$118.45	$118.45	$118.45	$113.70	$93.23
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.47
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.97
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	36.00	36.08	37.41	26.00	30.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 27 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.45
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.45
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	4.405	3.93
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	4.10-4.15
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.40
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.40
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.42
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.50
Plates, Chicago	4.225	4.225	4.225	4.10	3.50
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.10	3.60
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.50
Plates, Claymont, Del.	4.225	4.225	4.225	4.10	3.60
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.35
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.35
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.30
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pittsburgh	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.15
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.30
Strip, C.R., Detroit	5.90	5.90	5.90	5.65	4.35-4.40
Wire, Basic, Pittsburgh	5.75	5.75	5.75	5.525	4.50
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.55	5.30
Tin Plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$63.00
Wire Rods, ⅜-⅝" Pitts.	4.675	4.675	4.675	4.525	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	59.66	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	55.16	55.16	55.16	60.16	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	49.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne.	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$35.50	$35.50	$38.50	$26.50	$34.00
No. 1 Heavy Melt, E. Pa.	37.50	37.75	37.75	22.00	27.00
No. 1 Heavy Melt, Chicago	35.00	35.00	36.00	29.50	29.50
No. 1 Heavy Melt, Valley	35.50	35.50	37.50	28.50	33.75
No. 1 Heavy Melt, Cleve.	33.50	33.50	35.00	25.50	30.25
No. 1 Heavy Melt, Buffalo	32.50	32.50	32.50	25.50	29.75
Rails, Rerolling, Chicago	52.50	52.50	50.50	39.50	46.50
No. 1 Cast, Chicago	40.50	41.50	41.50	38.50	42.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$14.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	16.75	16.00
Oven, Fdry, Chicago	24.50	24.50	24.50	24.50	21.00

Daily Nonferrous Price Record

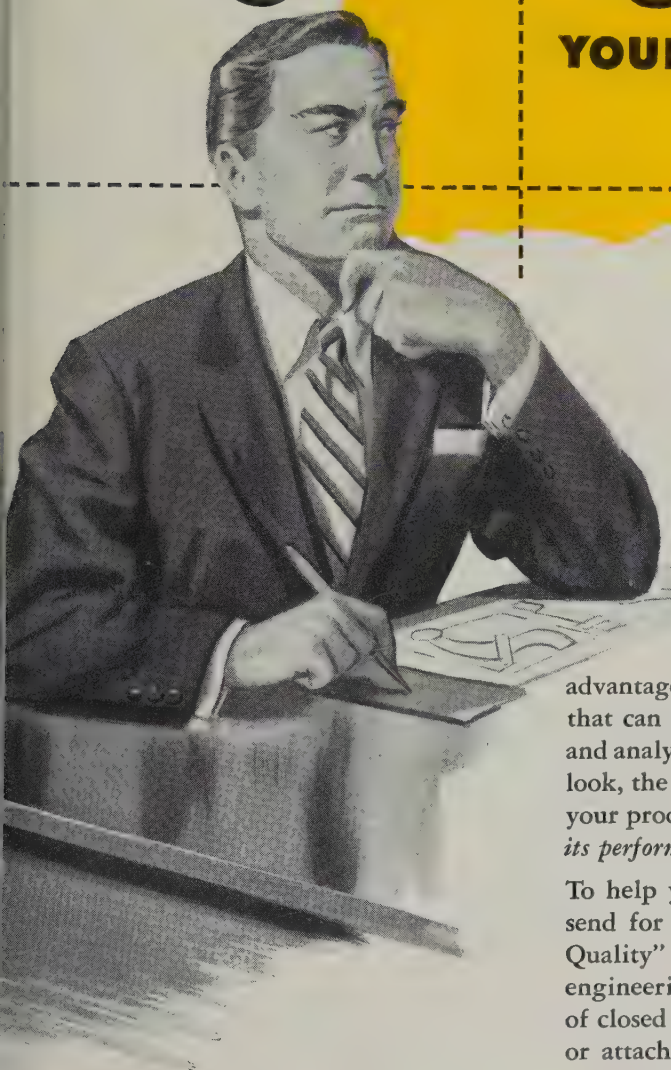
	Price Apr. 27	Last Change	Previous Price	Mar. Avg.	Feb. Avg.	Apr. 1954 Avg.
Copper	36.00	Mar. 29, 1955	33.00	33.222	33.000	29.955
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.710
Zinc	12.00	Apr. 6, 1955	11.50	11.500	11.500	10.250
Tin	91.50	Apr. 27, 1955	91.75	87.194	90.908	96.260
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	23.200	23.200	21.500
Magnesium	28.50	Mar. 21, 1955	27.00	27.556	27.000	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC prime western, E. St. Louis; TIN Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size a refinery, unpacked; ALUMINUM, primary ingots, 99+%, deld.; MAGNESIUM 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

ARE THE PARTS IN *Your* PRODUCT YOUR OWN COMPETITION?

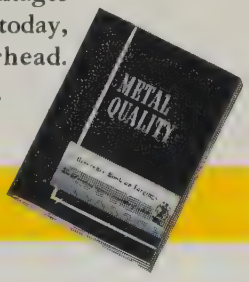


Finding better ways to improve your product and decrease its cost can begin with a **FORGING**

● Obviously, such a question is important. It means that you begin to consider the processes as well as the materials that eventually make up your product. Closed die forgings offer basic cost-saving advantages as well as scientific and engineering advancements that can contribute importantly to your successful evaluation and analysis. If it has been some time since you really took a close look, the conclusions may surprise you. Forgings can improve your product in many ways—*its cost*, its quality, *its salability* and *its performance.*

To help you evaluate the advantages of closed die forgings, send for this descriptive 64-page booklet* entitled "Metal Quality" which thoroughly discusses many of the engineering, production and economic advantages of closed die forgings. Write for your copy today, or attach coupon to your business letterhead.

**Distributed within Continental United States and Canada.*



DROP FORGING ASSOCIATION
605 Hanna Building, Dept. S., Cleveland 15, Ohio

Please send 64-page booklet entitled, "Metal Quality—How Hot Working Improves Properties of Metal," 1953 Edition.*

Name ..... *Position* .....

Company .....

Address .....

City and State ..... *Zone* .....

DROP FORGING ASSOCIATION
605 Hanna Building
CLEVELAND 15, OHIO

Nonferrous Metals

Members of lead, zinc, copper and brass warehouse groups take time out from production, price, supply-and-demand problems to hear encouraging words about future

Nonferrous Metals Prices, Pages 150 & 151

OPTIMISM WAS THE KEYNOTE last week as three segments of the nonferrous world gathered in annual conventions. While the lead and zinc people in Chicago listened to glowing reports on the future of their industries, the copper and brass warehousemen heard much the same story in Hollywood Beach, Fla.

John D. Sullivan, Battelle Memorial Institute, Columbus, O., told the 37th annual meeting of the American Zinc Institute Inc., that "we should and must consume more metals" not only to maintain our high standard of living but also to improve it. He maintained that this standard is measured not so much in production but more in terms of ability to consume what we produce.

Yardsticks—To illustrate the importance of metals in our standard of living, Mr. Sullivan cited the following figures showing per capita consumption of various metals in recent years:

ALUMINUM	18.0 lb
COPPER	14.9 "
LEAD	15.0 "
IRON & STEEL	1150.0 "
NICKEL	1.2 "
TIN	0.75 "
ZINC	12.0 "

In every case but one, the United States is far ahead of all other countries of the world. In the lone exception—copper—Great Britain has a per capita consumption of 16 lb. It should be noted that in several years the U. S. has exceeded that amount.

End Products, Too—Not only in base metals does this country have the greatest rate of consumption, Mr. Sullivan said, but also in end products. He cited figures for automobiles, telephones, radios and TV sets.

He said that our basic standard of living is measured in consumption of such necessities as food and clothing. But superimposed on this is a second standard based on metallic and mineral products. It is this second standard that makes ours a dynamic and resourceful economy, he claimed.

Bright Future For Galvanized—K. J. Burns, manager of sales, Sheet & Strip Division, Inland Steel Co., told zincmen the "outlook for galvanized was never brighter than it is right now" because of improved quality and continued discovery of new uses. He predicted shipments of galvanized sheets this year will reach a record 2.5 million tons, which will consume 195,000 tons of slab zinc. Highest previous tonnage of zinc for galvanizing sheets and strip was 188,406 tons in 1950. Next year could see shipments of 3 million tons of galvanized sheets, he predicted.

There can be no doubt, Mr. Burns said, that substitute materials have made inroads into markets formerly held by galvanized sheets. But thanks to the continuous line process, he continued: "The galvanized sheet industry is fighting back with a quality product in increasing volume. This can mean only one thing—the industry should be a large consumer of zinc for years to come."

Good Diecasting, Too — David Laine, secretary, American Die Casting Institute, pointed out to convention goers that the 1954 program of the Joint Market Development Committee of AZI and ADCI has had the following results:

1. The approach to wider markets for zinc diecastings through increased acceptance of all diecasting is justified.

2. The committee is of proved value to both industries.

3. Confidence in zinc as a reliable raw material has been established.

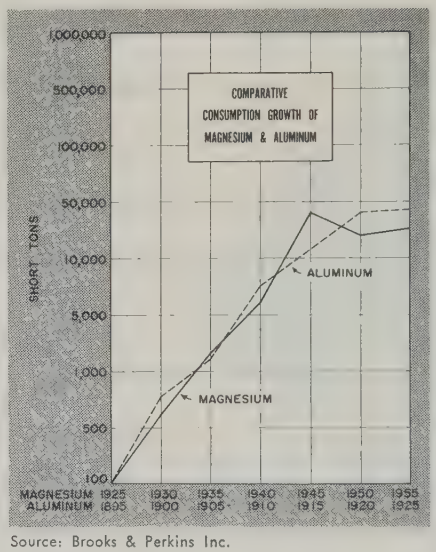
4. This year will probably see record consumption of 285,000 to 300,000 tons of zinc in diecastings. Next year should hold that level.

5. Continued co-operation can make possible even higher levels in 1957—and at a profit.

New Market for Anodes—A. W. Peabody, Ebasco Services Inc., told the meeting that with the proper development and approach, the cathodic protection of submerged fuel tanks and pipe lines at service stations and private homes could mean a substantial market for zinc anodes. Cathodic protection has been one of the institute's leading research projects the past year.

T. E. Veltfort, manager, Copper & Brass Research Association, sounded an optimistic note for the entire metals industry when he said that there is room in our expanding economy for all competing metals. But he warned the convention that each segment of the industry has to do some aggressive promotion if it wants to assure itself of an appropriate share of the market.

What Will the Next 30 Years Bring?



Source: Brooks & Perkins Inc.

Copper Outlook Encouraging

In Florida, Justice Lockwood, vice president, American Brass Co., told members of Copper & Brass Warehouse Association that even though demand for copper and its alloys will "skyrocket" in the next decade, new sources of copper will enable industry to meet the demand. He based his prediction of consumption growth largely on the forecast that the electric power industry will be producing about 200 million kilowatts by 1965 or nearly double that being produced today. In addition to the direct requirements for such expansion, there will be heavy copper demands from producers of motors and other related products. Consumption also will increase greatly in the automobile, appliance and radio, TV and electronics industries.

Market Memo

• Quarterly reports from nonferrous companies indicate a record year is in prospect for both sales and earnings.

The entire shell of the bucket on this 50-cu. yd. power shovel is fabricated from ¾" and 6½" "T-1" Steel Plate. Liner plates are made of ½" "T-1" Steel. "T-1" Steel Plate only 6½" thick has replaced large castings a foot thick in the lip of the bucket. Lighter weight construction with "T-1" Steel made it possible to increase the cubic capacity of the bucket by ten yards.

How

USS "T-1" STEEL n big machines

cuts weight, cuts cost, increases service life

Hanna Coal Company just can't afford o have this giant 50-cu. yd. shovel break down. This machine can move 2,280,000 tons of material a month, and t must operate continuously—24 hours a day, 7 days a week—to pay off.

Strong, weldable "T-1" Steel has improved the performance of this incredibly rugged machine, and it also has cut cost and weight. It enables the designers to use *fabricated* parts in place of larger, heavier, more expensive castings. And these lower-cost fabricated parts actually *last longer* than castings. As a result, Hanna Coal Company has standardized on "T-1" Steel for the vital parts of much of its heaviest-duty equipment.

Write for complete information on new USS "T-1" Steel. It has application in pressure vessels, rotating machinery, structural steel towers, steel mill equipment, big trucks, mine cars, and elsewhere.

Visit the U.S. Steel Booth
at the
AMERICAN MINING CONGRESS AND COAL SHOW
MAY 16-19, 1955
CLEVELAND, OHIO

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T" CONSTRUCTIONAL ALLOY STEEL

USS TRADE MARK

UNITED STATES STEEL

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 25.00; No. 43, 5% Si, 24.80; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.20; No. 195, 4.5% Cu, 0.8% Si, 25.50; No. 214, 3.8% Mg, 26.20; No. 356, 7% Si, 0.3% Mg, 24.90.

Antimony: R.M.M. brand, 99.5%, 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic 36.00 deld. Conn. Valley; 36.00 deld. Midwest; Lake 36.00 deld; Fire refined 35.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 99 + %, $13-$18, f.o.b. Minneapolis, depending on quantity and form. For rod, add $2 a lb; for wire, add $3 a lb.

Magnesium: 99.8%, self-palletizing pig 28.50; notched ingot 29.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.50 for both pig and ingot. Sticks 1.3 in. diameter, 49.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 34.00; alloy M 36.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $315-$318 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3-$3.25 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.65; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $120-$130, nom., per troy oz.

Palladium: $17-$20 per troy oz.

Platinum: $76-$80 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$56 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Silver: Open market, 87.00 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod $68.70 per lb; powder $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 91.50; prompt, 91.375.

Titanium: Sponge, 99.3+ %, grade A-1 ductile (0.3% Fe max) $3.95, grade A-2 (0.5% Fe max) $3.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots $4.35-$4.40 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 12.00; brass special, 12.25; intermediate, 12.50, E. St. Louis, freight allowed over 0.50 per pound. High grade, 13.35; special high grade, 13.50. Diecasting alloy ingot No. 3, 16.00; Nos. 2 and 5, 16.50.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy, 29.00-30.00; No. 12 foundry alloy (No. 2 grade), 28.50-29.50; 5% silicon alloy, 0.60 Cu max, 30.25-31.25; 13 alloy, 0.60 Cu max, 30.25-31.25; 195 alloy, 30.25-31.50; 108 alloy, 29.00-30.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 30.25-31.50; grade 2, 29.00-30.50; grade 3, 28.00-29.50; grade 4, 27.00-28.75.

Brass Ingot: Red brass No. 115, 35.50; tin bronze No. 225, 47.00; No. 245, 40.75; high-leaded tin bronze No. 305, 39.50, No. 1 yellow, No. 405, 30.75; manganese bronze No. 421, 33.25.

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 26.00; AZ91B, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.74; rod, bar, wire, $1.71.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 41.35-42.45; 30,000-lb lots, 41.48-42.58; l.c.l., 41.98-43.08. Weatherproof, 100,000 lb, 40.78-41.60; 30,000 lb, 41.03-41.85; l.c.l., 41.53-42.35. Magnet wire deld., 15,000 lb or more, 48.15-49.31; l.c.l., 48.90-50.06.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more $20 per cwt; pipe, full coils $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 19.50-20.50; plates, 18.50-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0		
0.156-0.172	53.9	52.3		
0.188	53.9	52.3		66.8
0.219-0.234	51.1	49.5		
0.250-0.281	51.1	49.5		63.7
0.313	51.1	49.5		60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	52.1	50.6
1.063	48.7	46.3		48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4		
1.625-2.000	45.1	42.8		47.2
2.125-2.500	44.0	41.7		
2.563-3.375	42.7	40.5		

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	35.9	40.4		
0.135-0.096	36.4	41.3		
0.095-0.077	37.1	42.3	34.6	39.6
0.076-0.061	37.7	43.2	34.8	39.8
0.060-0.048	38.2	43.6	35.1	40.2
0.047-0.038	38.7	44.5	35.6	40.6
0.037-0.030	39.1	45.0	36.0	41.3
0.029-0.024	39.7	45.5	36.3	41.8
0.023-0.019	40.4	46.9	37.1	42.6
0.018-0.017	41.2		37.7	43.5
0.016-0.015	42.1		38.5	44.7
0.014	43.1		39.5	46.0
0.013-0.012	44.3		40.2	47.0
0.011	45.3		41.4	48.6
0.010-0.0095	46.5		42.5	50.2
0.009-0.0085	47.8		44.0	52.3
0.008-0.0075	49.4		45.2	54.1
0.007	50.9		46.7	56.4
0.006	52.5		48.1	61.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.6	38.8
5050-F	35.7	39.9
3004-F	36.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.0
2024-T4*	41.8	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or diam, 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 47.80-37.30, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.60-41.00 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.10	2	$ 49.55
1	25.35	4	136.65
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 97.00, 0.064-in. 76.00, 0.125-in. 61.50, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 59.00, 30,000 lb or more, 0.250 in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 62.00, 30,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; 2 in., 66.50. Tubing, 1 in. OD x 0.065 in., 90.00. Angles, 1 x 1 x ⅛-in., 75.90; 2 x 2 x ¼-in., 70.00. Channels, 5 in., 70.90. I-beams, 5 in., 70.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings 18.00-18.50; old sheet 15.50-16.00; borings and turnings 9.50-10.50; crankcases 15.50-16.00; industrial castings 15.50-16.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.76b	52.36c	....	54.82	32.000	32.000	31.250
Yellow Brass	46.27	46.21d	46.81	49.18	23.875	26.625	22.000
Red Brass, 85%	50.99	50.93	51.53	53.80	28.125	27.875	27.375
Low Brass, 80%	49.75	49.69	50.29	52.56	27.000	26.750	26.750
Naval Brass	49.99	44.30	57.05	53.15	22.125	21.875	21.375
Com. Bronze, 90%	52.78	52.72	53.32	55.34	29.250	29.000	28.500
Nickel Silver, 10%	60.20	62.53g	62.53	....	27.625	27.375	13.813
Phos. Bronze, A, 5%	73.03	73.53	73.53	74.71	32.250	32.000	31.000
Silicon Bronze	58.82	58.01	58.86	60.80e	31.125	30.875	30.125
Manganese Bronze	53.73	47.83	58.24	....	22.125	21.875	21.375
Muntz Metal	48.14	43.95	....	....	22.375	22.125	21.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

er and Brass: No. 1 heavy copper and 30.50-31.50; No. 2 copper, 29.50-30.00; copper 27.50-28.00; No. 1 composition red 26.00-26.50; No. 1 composition turnings, -25.50; yellow brass turnings, 16.00-16.50; brass clippings, 21.00-22.00; No. 1 brass turnings, 19.50-20.00; light brass, 16.00-; heavy yellow brass, 18.50-19.00; new rod ends 20.50-21.00; auto radiators, eated, 19.00-19.50; cocks and faucets, -22.00; brass pipe, 21.50-22.00.

: Heavy 11.50-11.75; battery plate 6.50-linotype and stereotype 13.50-14.50; elec-pe 12.00-12.50; mixed babbitt 12.00-12.50.

nesium: Clippings 18.50-19.50; clean cast-. 18.00-19.00; iron castings, not over 10% ovable Fe, less full deduction for Fe, 16.00-).

el: Clippings 28.00-34.00; old sheet 26.00-); turnings 21.00; rods 28.00-34.00.

el: Sheets and clips 57.00-70.00; rolled es 57.00-70.00; turnings 40.00-55.00; rod 57.00-70.00.

No. 1 pewter 50.00-55.00; block tin pipe -75.00; No. 1 babbitt 45.00-48.00.

: Old zinc 4.75-5.50; new die cast scrap 5.00; old die cast scrap 3.25-3.50.

REFINERS' BUYING PRICES

ts per pound, carlots, delivered refinery)

inum: 1100 clippings, 19.50-21.50; 3003 ings, 19.50-21.50; 6151 clippings, 19.50-); 5052 clippings, 19.50-21.50; 2014 clip-s, 19.00-20.50; 2017 clippings, 19.00-20.50; clippings, 19.00-20.50; mixed clippings, -20.50; old sheet, 18.00-19.00; old cast, 0-19.00; clean old cable (free of steel), 0-21.50; borings and turnings, 17.50-19.50.

llium Copper: Heavy scrap, 0.020-in. and ier, not less than 1.5% Be, 48.00; light p 43.00.

per, Brass: No. 1 copper, 34.50; No. 2 per, 33.00; light copper, 31.25; refinery s (60% copper) per dry copper content, 0.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

per, Brass: No. 1 copper, 33.00-33.50; No. pper, 31.50-32.00; light copper, 29.25-29.75; 1 composition borings, 27.00-27.50; No. 1 position solids, 27.50-28.00; heavy yellow ss solids, 21.00-21.50; yellow brass turn-, 20.00-21.00; radiators, 20.00-21.50.

PLATING MATERIAL

o.b. shipping point, freight allowed on ntities)

ANODES

mium: Special or patented shapes $1.70 lb.

per: Flat-rolled 51.42, oval 50.92, 5000-00 lb; electrodeposited 49.40, 2000-5000 lb ; cast 50.54, 5000-10,000 lb quantities.

kel: Depolarized, less than 100 lb $1.015; -499 lb 99.50; 500-4999 lb 95.50; 5000-29,999 3.50; 30,000 lb 91.50. Carbonized, deduct 3 ts a lb. All prices eastern delivery effective 1, 1955.

: Bar or slab, less than 200 lb, $1.105; 200-lb, $1.09; 500-999 lb, $1.085; 1000 lb or re, $1.08.

c: Bar 20.00, bar or flat top 19.00, ton .

CHEMICALS

lmium Oxide: $2.15 per lb, in 100-lb drums.

romic Acid: Less than 10,000 lb 28.50; over 000 lb 27.50.

pper Cyanide: 100 lb 76.80; 200 lb 76.05; lb 75.80; 400-900 lb 75.05; 1000 lb and r 73.05; effective Mar. 24, 1955.

pper Sulphate: Crystal, 100 lb 21.50; 200 lb 50; 300 lb 17.50; 400 lb 17.00; 500-1900 lb 50; 2000-10,000 lb 15.25; 10,000 lb and up 15. Powder, add 0.5 to above prices. Ef-tive Mar. 29, 1955.

kel Chloride: 100 lb 46.50; 200 lb 44.50; lb 43.50; 400-4900 lb 41.50; 5000-9900 lb 50; 10,000 lb and over 38.50. All prices tern delivery, effective Jan. 1, 1955.

kel Sulphate: 100 lb 38.25; 200 lb 36.25; lb 35.25; 400-4900 lb 33.25; 5000-35,900 31.25; 36,000 lb 30.25. All prices eastern ivery, effective Jan. 1, 1955.

ver Cyanide: (Cents per ounce) 4-oz bottle, 125; 16-oz bottle, 81.875; 80-oz bottle, 375; 100-oz bottle, 79.375; f.o.b. St. Louis, w York and Los Angeles. Effective Apr. 6, 5.

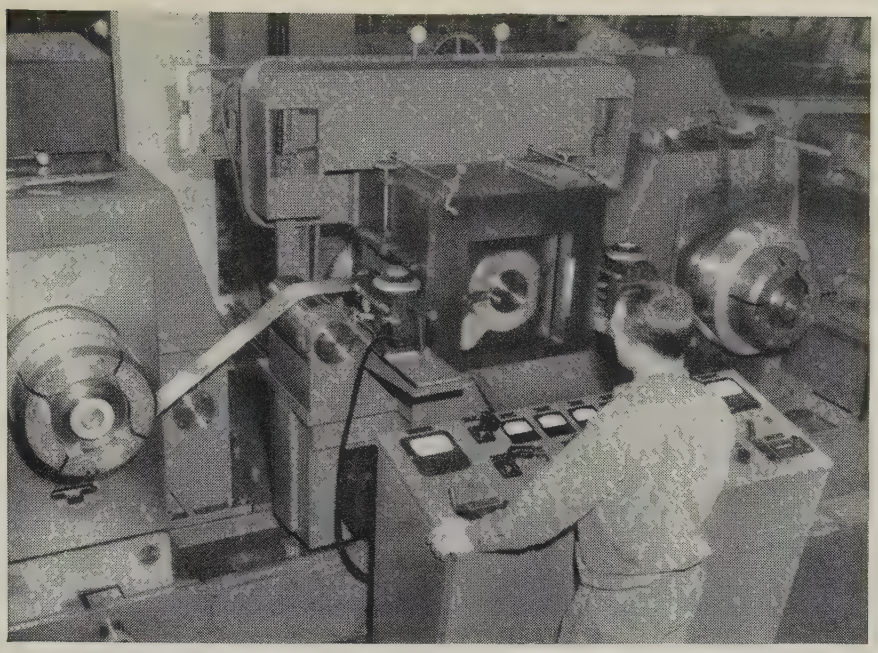
lium Cyanide: Egg, under 1000 lb 19.80; 0-19,900 lb 18.80; 20,000 lb and over 17.80; nular, add 1-cent premium to above.

lium Stannate: Less than 100 lb, 70.60; 100-lb, 56.30; 700-1900 lb, 53.90; 2000-9900 lb, 10; 10.000 lb or more, 51.00.

nnous Chloride (Anhydrous): Less than 50 $1.564; 50 lb, $1.224; 100-300 lb, $1.074, -900 lb, $1.049; 1000-1900 lb, $1.025; 2000-0 lb, 98.80; 5000-19,900 lb, 92.70; 20,000 lb more, 86.60.

nnous Sulphate: Less than 50 lb, $1.264; 50 96.40; 100-1900 lb, 94.40; 2000 lb or more, 40.

e Cyanide: Under 1000 lb 54.30; 1000 lb over 52.30.



TYPICAL OF NEW PRODUCTION EQUIPMENT installed in the Beryllium plant is this Sendzimir cold-rolling mill which handles wider strip faster than previous equipment, while its precision makes possible greater dimensional control and quality of product.

THE NEWS FROM BERYLLIUM IS EXPANSION

New production facilities improve quality, expand size, tighten tolerance range and increase availability of "Berylco" Beryllium Copper

The laboratory stage of beryllium lasted from its discovery in the 1790's until early in the 1930's. The last two decades might be termed the pilot stage, for the value of beryllium and its alloys, particularly beryllium copper, was being proved throughout industry. Indications from large-volume users are that a new era is on hand—the mass-production era. To make this possible, the world's largest producer, The Beryllium Corporation, has just completed a multimillion-dollar plant improvement program as part of an overall expansion plan.

This program encompasses the whole production set-up, from the ball mills that grind ore to the finishing mills. Cold-rolling capacity, for instance, has been multiplied by the installation of new strip mills. New finishing mills not only increase capacity, but make possible closer tolerances and new strip sizes. Sufficient economies have already been realized to warrant price reductions on strip in lighter gages to large volume users. A new extrusion mill supplements existing hot-rolling facilities and provides sizes, shapes and forms not produced heretofore. Thus beryllium copper is now being made available in greater quantities, more numerous forms, and improved quality.

Write for technical information, engineering help or free testing samples.

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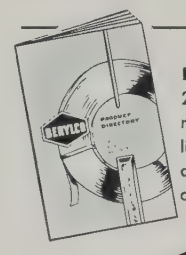

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THE BERYLLIUM CORPORATION

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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company. Key on page 153. Key to footnotes, page 155.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)

Detroit R7 .....$65.00
Houston S5 .....70.00
Midland,Pa. C1S 65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 .....$64.00
Bessemer,Pa. U5 .....64.00
Bridgeport,Conn. N19 ..69.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 .....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
Pittsburgh J5 .....64.00
So.Chicago,Ill. R2, U5..64.00
So.Duquesne,Pa. U5 ..64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$78.00
Bessemer,Pa. U5 .....78.00
Bridgeport,Conn. N19 ..83.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 .....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 .....78.00
Houston S5 .....83.00
Johnstown,Pa. B2 .....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.50
Midland,Pa. C18 .....78.00
Munhall,Pa. U5 .....78.00
Pittsburgh J5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14. 78.00
So.Duquesne,Pa. U5 ..78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 ....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....91.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 ....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago R2,U5,W14. 86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP

Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
SparrowsPoint,Md. B2 ..3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS

AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....4.925
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 .....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....4.925
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ...5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 .....4.675
SparrowsPoint,Md. B2..4.775
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
Torrance,Calif. C11 ....5.475
Worcester,Mass. A7 ...4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.30
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y B2 ..4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.90
Portland,Oreg. O4 .....5.00
Phoenixville,Pa. 4.20
Seattle B3 .....5.00
So.Chicago U5, W14 ....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange

Bethlehem Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....4.30
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.25
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston S5 .....6.45
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES

Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ...5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 .....5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Bridgeport,Conn. N19 ..4.475
Buffalo R2 .....4.225
Clairton, Pa. U5 .....4.225
Claymont,Del. C22 .....4.225
Cleveland J5, R2 .....4.225
Coatesville,Pa. L7 .....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.325
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....4.225
Houston S5 .....4.275
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 .....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago R2, U5, W14 4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ...4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2,U5,Y1..4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron

Economy,Pa. B14 .....9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Coatesville,Pa. L7 .....6.45
Conshohocken,Pa. A3 ...6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston S5 .....6.50
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2 ..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy

Claymont,Del. C22 .....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif. K1 .....6.45
Gary,Ind. U5 .....5.80
Houston S5 .....5.85
Ind.Harbor,Ind. Y1 ....5.80
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80
Youngstown Y1 .....5.80

FLOOR PLATES

Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 ....5.275
Ind.Harbor,Ind. I-2 ...5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 .....5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 .....4.825

BARS

BAR, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Bridgeport,Conn. N19 ...4.55
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.40
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.55
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Midland,Pa. C18 .....4.30
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.30
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23 ...5.05
So.Chicago R2,U5,W14 ..4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 .....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.075
Bridgeport,Conn. N19 ..5.225
Buffalo R2 .....5.075
Canton,O. R2, T7 .....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.175
Fontana,Calif. K1 ....6.125
FairlessHills,Pa. U5 ...5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1.5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. S5 .....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2,U5,W14..5.075
So.Duquesne,Pa. U5 ...5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 .....5.825

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.70
Ind.Harb.,Ind. I-2, Y1 ..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....6.70
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ....6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.45
KansasCity,Mo. S5 .....5.45
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W1S 5.40
BeaverFalls,Pa. M12, R2.5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 .....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.40
GreenBay, Wis. F7 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 .....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ....6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 .....5.65
Putnam,Conn. W18 .....5.95
Readville,Mass. C14 ....5.95
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 .....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. F7 .....6.625
Hammond,Ind. L2,M13.6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2 ...6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ...6.925
Massillon,O. R2, R8 ...6.625
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ...6.925
Youngstown F3, Y1.....6.625

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....7.525
Camden,N.J. P13 .....7.70
Carnegie,Pa. C12 .....7.525
Chicago W18 .....7.525
Cleveland C20 .....7.525
Monaca,Pa. S17 .....7.525
Newark,N.J. W18 .....7.70
SpringCity,Pa. K3 .....7.70
Warren,O. C17 .....7.525

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston S5 .....4.55

Harbor,Ind. I-2, Y1 4.30
nstown,Pa. B2 ..... 4.30
sasCity,Mo. S5 ..... 4.55
kawanna,N.Y. B2 ... 4.30
Angeles B3 ..... 5.00
on,Pa. M18 ..... 4.30
nequa,Colo. C10 .... 4.75
s,Calif. P1 ..... 5.00
sburg,Calif. C11 ... 5.00
sburgh J5 ..... 4.30
land,Oreg. O4 ..... 5.05
dSprings,Okla. S5 ... 4.80
ttle B3, N14, P23 ... 5.05
Chicago R2 ..... 4.30
Duquesne,Pa. U5 .... 4.30
SanFrancisco B3 .... 5.05
rrowsPoint,Md. B2 .. 4.30
ling,Ill.(1) N15 .... 4.30
ling,Ill. N15 ..... 4.40
thers,O. Y1 ..... 4.30
rance,Calif. C11 .... 5.00
ngstown R2, U5 .... 4.30

S, Reinforcing

fabricated; to Consumers)

nstown,Pa. ¼-1" B2 .. 5.70
sasCity,Kans. S5 ... 6.50
Angeles B3 ..... 5.95
rion,O. P11 ..... 5.55
sburgh J5, U8 ..... 5.72
ttle B3, N14, P23 ... 6.15
SanFrancisco B3 .... 6.00
rrowsPt. ½-1" B2 .. 5.70
lliamsport,Pa. S19 .. 5.60

L STEEL BARS

s,Pa.(3) J8 ..... 4.25
cagoHts.(3) C2, I-2.. 4.20
cagoHts.(4) C2, I-2.. 4.30
Worth,Tex.(26) T4 .. 4.75
nklin,Pa.(3) F5 .... 4.20
nklin,Pa.(4) F5 .... 4.30
rion,O.(3) P11 ..... 4.20
eline,Ill(3) R2 ..... 4.30
nawanda(3) B12 .... 4.15
nawanda(4) B12 .... 4.30
lliamsport,Pa.(3) S19 .4.30

RS, Wrought Iron

onomy,Pa.(S.R.) B14 10.85
onomy,Pa.(D.R.) B14 13.50
onomy(Staybolt) B14 13.80
K.Rks(S.R.) L5 .... 10.85
K.Rks.(D.R.) L5 ... 14.75
K.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.05
Allenport,Pa. P7 ..... 4.05
Ashland,Ky.(8) A10 .... 4.05
Cleveland J5, R2 ..... 4.05
Conshohocken,Pa. A3 ... 4.10
Detroit(8) M1 ..... 4.15
Dravosburg,Pa. U5 .... 4.05
Ecorse,Mich. G5 ..... 4.15
Fairfield,Ala. T2 ..... 4.05
FairlessHills,Pa. U5 .... 4.10
Fontana,Calif. K1 .... 4.825
Gary,Ind. U5 ..... 4.05
Geneva,Utah C11 ..... 4.15
GraniteCity,Ill. G4 .... 4.25
Ind.Harbor,Ind. I-2, Y1 4.05
Kokomo,Ind. C16 ..... 4.15
Lackawanna,N.Y. B2 ... 4.05
Mansfield,O. E6 (37) ... 4.05
Mansfield,O. E6 (38) ... 4.80
Munhall,Pa. U5 ..... 4.05
Newport,Ky. N9 ..... 4.05
Niles,O. N12 ..... 4.05
Pittsburg,Calif. C11 .... 4.75
Pittsburgh J5 ..... 4.05
Portsmouth,O. P12 .... 4.05
Riverdale,Ill. A1 ..... 4.05
Sharon,Pa. S3 ..... 4.05
So.Chicago,Ill. W14 .... 4.05
SparrowsPoint,Md. B2 .. 4.05
Steubenville,O. W10 .... 4.05
Warren,O. R2 ..... 4.05
Weirton,W.Va. W6 .... 4.05
Youngstown U5, Y1 .... 4.05

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.35
Kokomo,Ind. C16..... 5.20
Niles,O. N12 ..... 4.95

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .... 5.80
Youngstown Y1 ..... 5.80

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.10
Conshohocken,Pa. A3 ... 6.15
Dravosburg,Pa. U5 .... 6.10
Ecorse,Mich. G5 ..... 6.20
Fairfield,Ala T2 ..... 6.10
FairlessHills,Pa. U5 .... 6.15
Fontana,Calif. K1 .... 6.875
Gary,Ind. U5 ..... 6.10
Ind.Harbor,Ind. I-2, Y1 6.10
Lackawanna(35) B2 .... 6.10
Munhall,Pa. U5 ..... 6.10
Pittsburgh J5 ..... 6.10
Sharon,Pa. S3 ..... 6.10
So.Chicago,Ill. U5 ..... 6.10
SparrowsPoint(36) B2 .. 6.10
Warren,O. R2 ..... 6.10
Weirton,W.Va. W6 .... 6.10
Youngstown U5, Y1 .... 6.10

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 .... 4.30
Cleveland R2 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.30
Warren,O. R2 ..... 4.65

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 4.95
Cleveland J5, R2 ..... 4.95
Conshohocken,Pa. A3 ... 5.00
Dravosburg,Pa. U5 .... 4.95
Ecorse,Mich. G5 ..... 5.05
Fairfield,Ala. T2 ..... 4.95
FairlessHills,Pa. U5 .... 5.00
Follansbee,W.Va. F4 ... 4.95
Fontana,Calif. K1 .... 6.05
Gary,Ind. U5 ..... 4.95
GraniteCity,Ill. G4 .... 5.15
Ind.Harbor,Ind. I-2, Y1 4.95
Lackawanna,N.Y. B2 ... 4.95
Middletown,O. A10 .... 4.95
Newport,Ky. N9 ..... 4.95
Pittsburg,Calif. C11 .... 5.90
Pittsburgh J5 ..... 4.95
Portsmouth,O. P12 .... 4.95
SparrowsPoint,Md. B2.. 4.95
Warren,O. R2 ..... 4.95
Weirton,W.Va. W6 .... 4.95
Youngstown Y1 ..... 4.95

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.50
Dravosburg,Pa. U5 .... 7.50
Ecorse,Mich. G5 ..... 7.60
FairlessHills,Pa. U5 .... 7.55
Fontana,Calif. K1 ..... 8.55
Gary,Ind. U5 ..... 7.50
IndianaHarbor,Ind. Y1 .. 7.50
Lackawanna(37) B2 .... 7.50
Pittsburgh J5 ..... 7.50
SparrowsPoint(38) B2 .. 7.50
Warren,O. R2 ..... 7.50
Weirton,W.Va. W6 .... 7.50
Youngstown Y1 ..... 7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 5.55
Middletown,O. A10 .... 5.45
Warren,O. R2 ..... 5.55

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.50	....
Canton,O. R2	6.50	7.10
Dravosburg U5	5.70	....
Fairfield T2	5.70	....
Gary,Ind. U5	5.70	5.95
Ind.Harbor I-2	5.70	5.95
Kokomo,Ind. C16	5.80	....
MartinsFry. W10	5.70	....
Newport,Ky N9	5.70	5.95
Pitts.,Calif. C11	6.45	....
SparrowsPt. B2	5.70	....

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 6.75
Gary,Ind. U5 ..... 5.95
MartinsFerry,O. W10 ... 5.95

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.45‡
Ashland,Ky. A10 ..... 5.45*
Butler,Pa. A10 ..... 5.45†
Canton,O. R2 ..... 5.45‡
Delphos,O. N16 ..... 6.10‡
Dover,O. R1 ..... 5.45‡
Dravosburg,Pa. U5 ... 5.45†
Fairfield,Ala. T2 ..... 5.45†
Gary,Ind. U5 ..... 5.45*
GraniteCity,Ill. G4 .... 5.65‡
Ind.Harbor,Ind. I-2 ... 5.45†
Kokomo,Ind. C16 ..... 5.55‡
MartinsFerry,O. W10 .. 5.45*
Middletown,O. A10 .... 5.45†
Newport,Ky. N9 ..... 5.45‡
Niles,O. N12 ..... 5.45‡
Pittsburg,Calif. C11 .. 6.20*
SparrowsPt.,Md. B2 ... 5.45‡
Warren,O. R2 ..... 5.45†
Weirton,W.Va. W6 .... 5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.325

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 .... 8.20
SparrowsPoint(30) B2 .. 8.20

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 5.85
Dravosburg,Pa. U5 .... 5.85
Kokomo,Ind. C16 ..... 6.20
Newport,Ky. N9 ..... 5.85
Niles,O. N12 ..... 5.85

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 .... 5.70
Canton,O. R2 ..... 6.20

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 5.70
Butler,Pa. A10 ..... 5.70
Middletown,O. A10 .... 5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.30
Niles,O.(28) R2 ..... 6.30
Weirton,W.Va. W6 .... 6.15

SHEETS, Aluminum Coated

Butler,Pa. A10 ..... 8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ... 5.375
Cleveland R2 ..... 5.375
Dravosburg,Pa. U5 ... 5.375
Gary,Ind. U5 ..... 5.375
GraniteCity,Ill. G4 .... 5.575
Ind.Harbor,Ind. I-2 ... 5.375
Middletown,O. A10 .... 5.375
Niles,O. N12 ..... 5.375
Youngstown Y1 ..... 5.375

BLUED STOCK, 29 Gage

BeechBottom,W.Va. W10 5.85
Follansbee,W.Va. F4 .. 7.375
Follansbee(23) F4 ..... 6.60
Yorkville,O. W10 ..... 7.375

SHEETS, Long Terne Steel (Commercial Quality)

Gary,Ind. U5 ..... 5.85
Mansfield,O. E6 ..... 5.85
Middletown,O. A10 .... 5.85
Niles,O. N12 ..... 5.85
Weirton,W.Va. W6 .... 5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.25

Key to Producers

- Acme Steel Co.
- Alan Wood Steel Co.
- Allegheny Ludlum Steel
- Alloy Metal Wire Co.
- American Shim Steel Co.
- American Steel & Wire
- Anchor Drawn Steel Co.
- Angell Nail & Chaplet
- Armco Steel Corp.
- Atlantic Steel Co.

- Babcock & Wilcox Co.
- Bethlehem Steel Co.
- Beth. Pac. Coast Steel
- Blair Strip Steel Co.
- Bliss & Laughlin Inc.
- Braeburn Alloy Steel
- Brainard Steel Div., Sharon Steel Corp.
- E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
- Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
- Buffalo Steel Corp.
- A. M. Byers Co.
- J. Bishop & Co.

- Calstrip Steel Corp.
- Calumet Steel Div., Borg-Warner Corp.
- Carpenter Steel Co.
- Central Iron & Steel Div. Barium Steel Corp.
- Cleve. Cold Rolling Mills
- Cold Metal Products Co.
- Colonial Steel Co.
- Colorado Fuel & Iron
- Columbia-Geneva Steel
- Columbia Steel & Shaft.
- Columbia Tool Steel Co.
- Compressed Steel Shaft.
- Connors Steel Div. H. K. Porter Co. Inc.
- Continental Steel Corp.
- Copperweld Steel Co.
- Crucible Steel Co.

C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest. Steel Roll. Mills
N15 Northwestern S. & W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv., EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel&Mfg. Co.
W8 West. Auto. Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...4.05
Allenport,Pa. P7 .....4.05
Alton,Ill. L1 .....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn. N19 ..4.35
Buffalo(27) R2 .....4.05
Conshohocken,Pa. A3 ...4.10
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.15
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2 ..4.05
Lackaw'na,N.Y.(25) B2.4.05
LosAngeles(25) B3 ....4.80
Milton,Pa. M18 .....4.05
Minnequa,Colo. C10 .....5.15
N.Tonawanda,N.Y. B11..4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 ....4.05
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 .....5.00
Seattle(25) B3, P23 ....5.05
Seattle N14 .....5.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2 ..4.05
Sterling(1) N15 .....4.05
Sterling,Ill. N15 .....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ...7.00
Carnegie,Pa. S18 .....6.70
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....6.70
Ind.Harbor,Ind. Y1 ....6.70
LosAngeles B3 .....7.90
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5, Y1 ....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Houston S5 .....6.40
Ind.Harbor,Ind. I-2, Y1.6.15
KansasCity,Mo. S5 ....6.40
Lackawanna,N.Y. B2 ..6.15
LosAngeles(25) B3 ....6.90
Seattle(25) B3, P23 ....7.15
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 ....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.75
Baltimore T6 .....5.75
Boston T6 .....6.30
Cleveland A7, J5 .....5.75
Conshohocken,Pa. A3 ..5.80
Dearborn,Mich. D3 ....5.85
Detroit D2, M1, P20 ....5.85
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.85
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.50
FranklinPark,Ill. T6 ....5.85
Ind.Harbor,Ind. I-2 ....5.85
Ind.Harbor,Ind. Y1 ....5.75
Indianapolis C8 .....5.90
LosAngeles C1 .....7.80
Middletown,O. A10 ....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
NewKensington,Pa. A6..5.75
Pawtucket,R.I. R3 ....6.40
Pawtucket,R.I. N8 ....6.30
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 ....5.75
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2 ....5.75
Trenton,N.J.(31) R5 ..7.30
Wallingford,Conn. W2 ..6.20
Warren,O. B9, R2, T5..5.75
Weirton,W.Va. W6 ....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy

Boston T6 .....12.80
Carnegie,Pa. S18 .....12.45
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 ....14.55
FranklinPark,Ill. T6 ..12.45
Harrison,N.J. C18 ....12.45
Pawtucket,R.I. N8 ....12.80
Sharon,Pa. S3 .....12.45
Worcester,Mass. A7 ....12.75
Youngstown C8 .....12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 ....8.70
Dover,O. G6 .....8.60
Ecorse,Mich. G5 .....8.70
Ind.Harbor,Ind Y1 ....8.60
Lackawanna,N.Y. B2 ..8.425

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Boston T6	6.30	8.35	9.30	11.45	14.15
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.85	8.25	9.20	....	....
Detroit D2	5.85	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
NewBritain,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
NewKensington,Pa. A6	5.75	8.05	9.00	11.15	....
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill. A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford, Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
FranklinPark,Ill. T6	...	...	13.40	16.10	19.50
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.96	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. A7, T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Arma-ture	Electric	Motor	Dyna-mo
BeechBottom,W.Va. W10	....	....	9.10	10.10	11.00
Brackenridge,Pa. A4	....	....	9.10	10.10	11.00
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Arma-ture	Electric	Motor	Dyna-mo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95§	12.50§	13.00§	14.00§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

*Semiprocessed. †Fully processed only. ‡Coils annealed; semiprocessed ½c lower. §Coils, ¾-cent higher.

Pittsburgh J5 .....8.60
Sharon,Pa. S3 .....8.60
SparrowsPoint,Md. B2..8.425
Warren,O. R2 .....8.60
Weirton,W.Va. W6 ....8.60
Youngstown Y1 .....8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.35

STRIP, Electrogalvanized

Cleveland A7 .....5.75*
Dover,O. G6 .....5.75*
Riverdale,Ill. A1 .....5.85*
Youngstown C8 .....5.75*
Warren,O. B9, T5 ....5.75*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7 ....6.60*

*Plus galvanizing extras.

Strip, Galvanized (Continuous)

Sharon,Pa. S3 .....6.15
Warren,O. B9 .....6.15

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Dravosburg,Pa. U5	7.50	7.75	8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TINPLATE,American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Dravosburg,Pa. U5	8.80	9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Pitts.Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Dravosburg,Pa. U5	6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5 ....6.20
Follansbee,W.Va. F4 ...6.20
Gary,Ind. U5 .....6.20
GraniteCity,Ill. G4 .....6.30
Ind.Harbor,Ind. Y1 ....6.20
Yorkville,O. W10 .....6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5 ....$7.85
Gary,Ind. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5 .....9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...5.75
Aliquippa,Pa. J5 .....5.75
Alton,Ill. L1 .....5.925
Atlanta A11 .....5.95
Bartonville,Ill. K4 .....5.85
Buffalo W12 .....5.75
Chicago W13 .....5.75
Cleveland A7, C20 .....5.75
Crawfordsville,Ind. M8..5.85
Donora,Pa. A7 .....5.75
Duluth,Minn. A7 .....5.75
Fairfield,Ala. T2 .....5.75
Fostoria,O.(24) S1 .....5.95
Houston S5 .....6.00
Jacksonville,Fla. M8 ....6.27
Johnstown,Pa. B2 .....5.75
Joliet,Ill. A7 .....5.75
KansasCity,Mo. S5 .....6.00
Kokomo,Ind. C16 .....5.85
LosAngeles B3 .....6.70
Minnequa,Colo. C10 ....6.00
Monessen,Pa. P7 .....5.75
Newark 6-8 ga. I-1 .....6.40
No.Tonawanda B11 .....5.75
Palmer,Mass. W12 .....6.05
Pittsburg,Calif. C11 ....6.70
Portsmouth,O. P12 .....5.75
Rankin,Pa. A7 .....5.75
So.Chicago,Ill. R2 .....5.75
So.SanFrancisco C10 ...6.70
SparrowsPoint,Md. B2 ..5.85
Sterling,Ill.(1) N15 ....5.75
Sterling,Ill. N15 .....5.85
Struthers,O. Y1 .....5.75
Waukegan,Ill. A7 .....5.75
Worcester,Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.20
Alton Ill. L1 .....7.375
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Cleveland A7 .....7.20
Donora,Pa. A7 .....7.20
Duluth,Minn. A7 .....7.20
Fostoria,O. S1 .....7.20
Johnstown,Pa. B2 .....7.20
LosAngeles B3 .....8.15
Milbury,Mass.(12) N6 ..7.50
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16..7.20
Muncie,Ind. I-7 .....7.40
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth,O. P12 .....7.20
Roebling,N.J. R5 .....7.50
So.Chicago,Ill. R2 .....7.20
So.SanFrancisco C10 ...8.15
SparrowsPt.,Md. B2 ....7.30
Struthers,O. Y1 .....7.20
Trenton,N.J. A7 .....7.50
Waukegan,Ill. A7 .....7.20
Worcester A7,J4,T6,W12.7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....6.90
Alton,Ill. L1 .....7.075
Buffalo W12 .....6.90
Cleveland A7 .....6.90
Donora,Pa. A7 .....6.90
Duluth,Minn. A7 .....6.90
Johnstown,Pa. B2 .....6.90
KansasCity,Mo. S5 .....7.50
LosAngeles B3 .....7.85
Minnequa,Colo. C10 ....7.075
Monessen,Pa. P7, P16..6.90
NewHaven,Conn. A7 ....7.20
Palmer,Mass. W12 .....7.20
Pittsburg,Calif. C11 ....7.85
Portsmouth,O. P12 .....6.90
Roebling,N.J. R5 .....7.20
So.Chicago,Ill. R2 .....6.90
So.SanFrancisco C10 ...7.85
SparrowsPoint,Md. B2 ..7.00
Struthers,O. Y1 .....6.90
Trenton,N.J. A7 .....7.20
Waukegan,Ill. A7 .....6.90
Worcester,Mass. A7 ....7.20

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....11.375
Bartonville,Ill. K4 .....11.30
Buffalo W12 .....11.20
Chicago W13 .....11.20
Cleveland A7 .....11.20
Crawfordsville,Ind. M8.11.30
Fostoria,O. S1 .....11.20
Jacksonville,Fla. M8 ...11.73
Johnstown,Pa. B2 .....11.20
Kokomo,Ind. C16 .....11.20
Minnequa,Colo. C10 ...10.95
Monessen,Pa. P16 .....11.20
Muncie,Ind. I-7 .....11.40
Palmer,Mass. W12 .....11.50
Roebling,N.J. R5 .....11.50
So.SanFrancisco C10 ..11.55
Waukegan,Ill. A7 .....11.20
Worcester,Mass. A7, T6.11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....9.90
Buffalo W12 .....9.90
Johnstown,Pa. B2 .....9.90
Minnequa,Colo. C10 ..10.025
Monessen,Pa. P16 .....9.90
Muncie,Ind. I-7 .....10.10
Portsmouth,O. P12 .....9.90
Roebling,N.J. R5 .....10.20
SparrowsPt.,Md. B2 ...10.00

ROPE WIRE	(A)
Alton,Ill. L1	9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.75
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
SparrowsPt. B2	9.85
Struthers,O. Y1	9.75
Worcester,Mass. T6	9.65
Worcester,Mass. J4	10.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Elton,Ill. L1	13.25
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
Franklin Park,Ill. T6	8.05
Kokomo,Ind. C16	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Nawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	6.90	7.30**
Aliquippa J5	6.90	7.425§
Atlanta A11	7.00	7.55
Bartonville(48) K4	7.00	7.575
Buffalo W12	6.90	7.30†
Cleveland A7	6.90	....
Crawfordsville M8	7.00	7.55
Donora,Pa. A7	6.90	7.30†
Duluth,Minn. A7	6.90	7.30†
Fairfield T2	6.90	7.30†
Houston,Tex. S5	7.15	7.55†
Jacks'ville,Fla. M8	7.425	7.95
Johnstown B2(48).	6.90	7.45*
Joliet,Ill. A7	6.90	7.30†
KansasCity,Mo. S5	7.15	7.55†
Kokomo C16	7.00	7.40†
LosAngeles B3	7.85	....
Minnequa C10	7.15	7.55**
Monessen P7 (48)	6.90	7.45
Palmer,Mass. W12	7.20	7.60†
Pitts.,Calif. C11	7.85-8.25†	
Portsmouth,O. P12	6.90	....
Rankin A7	6.90	7.30†
So.Chicago R2	6.90	7.30**
So.S.Fran. C10	7.85	8.25**
SparwsPt.B2(48).	7.00	7.55*
Sterling(1)(48) N15	6.90	7.475
Struthers,O.(48) Y1	6.90	7.40‡
Worcester,Mass. A7	7.20	....

*Based on 11c zinc; †5c zinc; ‡Less than 10c zinc; §Subject to zinc equalization extras.

WOVEN Fence, 9-15½ Ga. Col.

Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga.J5	149§
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	151†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	151†
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	151**
Monessen,Pa. 9 ga. P17	149
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	150

*Based on 5c zinc; **11c zinc; §10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	160
KansasCity,Mo. S5	160
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed Col.

AlabamaCity,Ala. R2	159**
Aliquippa J5	156§
Atlanta A11	164
Bartonville,Ill. K4	165
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	164†
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	164†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	164**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
So.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	163

†Based on 5c zinc; *11c zinc; §10c zinc; **Subject to zinc equalization extras.

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	13.15	14.70**
Bartonville K4	13.25	15.10
Buffalo W12	13.15	....
Cleveland A7	13.15	....
Crawfrdsville M8	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	14.80†
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70†
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.05
Waukegan A7	13.15	14.70†
Worcester A7	13.45	....

*Based on 11c zinc; †5c zinc; §10c zinc; **Subject to zinc equalization extras.

NAILS, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	145
Houston,Tex. S5	142
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	142
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	139
Crawfordsville,Ind. M8	139
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
Sparrows Pt., Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

TIE WIRE, Automatic Baler
(14½ Ga.) Per 97 lb Net Box)

Coil No. 3150	
Donora,Pa. A7	$8.77
Duluth,Minn. A7	8.77
Joliet,Ill. A7	8.77
Coil No. 6500 Stand.	
Donora,Pa. A7	$9.05
Duluth,Minn. A7	9.05
Joliet,Ill. A7	9.05
Coil No. 6500 Interim	
Donora,Pa. A7	$9.10
Duluth,Minn. A7	9.10
Joliet,Ill. A7	9.10

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter:	
½-in. & smaller diam	2
Over 4 in. through 6 in.:	
½ in. & smaller diam	+3
6 in. and shorter:	
⅝-in. and ⅝-in.	+4
¾-in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage.	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoe	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex, regular & heavy:	
¾" and smaller	55
⅞" to 1⅛", inclusive.	58
1¼" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
¾" or smaller	38
⅞" to 1½", inclusive.	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in diam x 6 in. and shorter	34
1 in. and smaller diam x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	38
¾-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	23.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2¼	12	34.63	41.52	33.59
2½	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. U5	4.45	4.35	4.40	...
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...	(16)5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.35
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S10	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B2	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.i.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags.	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	21.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)..	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	83.00-148.00
Aluminum: Atomized, 500 lb drums, frght. allowed:	
Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	31.25-39.75†
Bronze, 5000-lb lots	51.50-54.75†
Copper: Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese: Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	97.00
Nickel-Silver, 5000-lb lots	47.50-51.00
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	$1.25
Tin	14.50*
Zinc, 5000-lb lots	17.25-31.00‡
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over.	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½" to 1 7/16"; 1 7/16" to 1 15/16" 4.78c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.35c. H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden,Ala. R2	52.38	52.88	....	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo H1, R2	56.00	56.50	57.00	57.50
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester,N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon,Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7, R2	56.00	56.50	56.50	57.00
Akron,O., deld.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Chester,Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKeesRocks, deld.	....	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos. 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$80.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	85.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	88.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland A7 (Intermediate)	$61.00
Lyles,Tenn. T3	70.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.55
Troy,N.Y. R2	64.00

Warehouse Steel Products

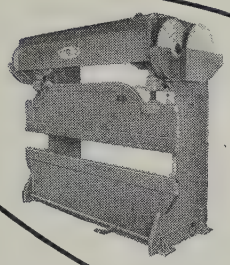
Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	...	6.68	8.02[6]	12.54	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25[2]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	45.28[9]	7.47	...	7.20	8.60	12.30	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.40	12.00	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	46.05	6.62	...	6.51	7.25	11.75	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	46.10	6.86	...	6.75	7.55	12.00	6.86	6.81	7.89
Cleveland	6.38	7.38	8.25	46.16	6.72	...	6.57	7.35	11.81	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.54	11.95	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.30	....	7.60	7.35	8.75
Los Angeles	7.50	9.35	9.95	50.15	7.85	11.75	7.45	10.15	13.15	7.65	7.45	9.55
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.44	11.84	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.60	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.95	7.56	...	7.37	8.73[6]	12.13	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98[9]	6.96	8.80	6.74	7.86[8]	11.96	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	46.00	6.72	...	6.51	7.35	11.75	6.69	6.52	7.64
Portland, Oreg.	7.00	7.75	8.90	48.50	7.25	...	7.05	10.20	14.00	7.00	6.85	8.75
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.64[8]	12.04	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.01	....	7.35	7.18	8.30
San Francisco	7.55	8.95	9.40	51.65	7.80	...	7.35	10.05	13.05	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	51.00	8.20	...	7.80	10.95	13.50	7.75	7.80	9.60
Spokane	8.35	9.65[7]	10.05	....	7.80	...	7.80	10.85§§	14.25	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11.50-cent zinc except in Buffalo and Spokane (11-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ½-in.

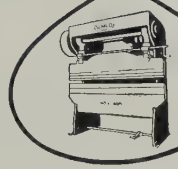
Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

FULL RANGE OF FORMING PRESS BRAKES BY SEMCO



Series No. 55-1012

The versatile SEMCO line is low priced, yet offers all the best Press Brake features and then some—



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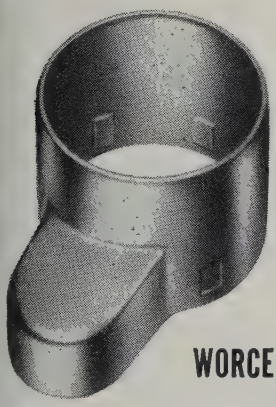

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COST JUST A FRACTION OF METAL SPACERS

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C

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STEEL CASTINGS

ARE FOUNDRY ENGINEERED

Regardless of the type of product you make — if you are interested in strength, toughness, uniform structure, resistance to fatigue, long life, lower machining and lower assembly costs — you'll be interested in C Steel Castings. The point is that they are sound, clean, true to pattern castings that by alloy and heat treating possess an almost unlimited range of mechanical properties.

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CRUCIBLE STEEL CASTING CO.

LANSDOWNE, PENNA.

HYDRAULIC DANGER ZONE

Ordinary hydraulic fluid, escaping under pressure, can start a fire 40 ft. or more away from a broken line! Is your plant safe? Here's how one firm protects men and machines inside the danger zone . . .

PYDRAUL INCREASES SAFETY, EFFICIENCY OF NEW 1900° FURNACE

MIDWEST PIPING COMPANY, INC., ST. LOUIS, designed two pipe-bending furnaces with hydraulic doors to replace dangerous levers. But the system created a problem: If 800 psi hydraulic lines were ruptured by falling brick or pipe, escaping fluid would explode immediately in 1900° F. furnace! Midwest investigated, then solved the problem by installing fire-resistant Pydraul fluid in all hydraulic lines. Result: Operators are safer . . . danger of hydraulic fires is eliminated . . . excellent lubricity of Pydraul has increased operating efficiency.

Pydraul: Reg. U. S. Pat. Off.

FIRE RESISTANT

In tests and actual service, Pydraul has been discharged over molten metal, red-hot ingots, arcs, open flame and sparks without fluid igniting . . . even at temperatures up to 6000° F!

. . . AND A TOP-GRADE LUBRICANT

After 200-hr. Vickers Vane Pump Test, pump rotor operated on petroleum fluid showed weight loss of 2.9 grams due to wear. Rotor with Pydraul lost no weight—lost only 0.1 gram after 800 hrs! Timken Lubricant Test and Almen Wear Test also show Pydraul excellent in lubrication characteristics.

PLUS . . .

HIGH STABILITY
LOW MAKE-UP RATE
CONTAINS NO WATER
NON-CORROSIVE
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MONSANTO
CHEMICALS—PLASTICS

Serving Industry . . . Which Serves Mankind

Republic Steel Corp.

Just as he checks the gage, be sure you check your needs as . . .

Stainless Steel Designations Are Revised

BEFORE you order stainless steel, take a second look at the type numbers you ask for.

There's a new list of designations.

Some types are added, and specifications of others are changed.

The new list of types and specifications is on p. 160.

There are 35 standard designations of stainless in the 300 and 400 series.

Announced by the American Iron & Steel Institute, the new list replaces the one issued in August, 1952. It had 34 standard and tentative standard types in the 300 and 400 series.

Changes also have been made in the published analyses of the 501 and 502 heat-resisting steels grouped with, but not classified as, stainless.

Reasons for Changes—The new list of designations of the 300 and 400 series, along with 501 and 502, results from improved practices in the steel industry, elimination of governmental controls and an effort to provide a wider flexibility in working stainless.

Six types underwent changes in the maximum allowable carbon content. They are 301, 302, 302B, 316, 317 and 446.

Six types underwent revisions in nickel-carbon and chrome-carbon ratios. They are 304, 304L, 317, 321, 347 and 405.

Three new types—303Se, 416Se and 430F Se—widen the selection in the high machinability types.

All TS (tentative standard) type designations are eliminated.

More Know-How — Changes in maximum allowable carbon content are made as a result of improvements in melting practice and metallurgical control. Producers are able to work to closer alloy limits, particularly on carbon. This permits a reduction in the percentage formerly specified for some types. Low carbon is required in most types for maximum resistance to corrosion, while higher carbon is employed for increased hardness, as in cutlery grades.

Wider Choice—By adding types 303Se, 416Se and 430F Se ("Se" means they contain selenium), the steel industry now offers a choice of high machinability grades through additions of sulphur or selenium. Sulphur-bearing stainless steels are reported to be more suitable for deep or heavy cuts, while selenium-bearing types are said to be preferred for shallow or light cuts.

War's Over—TS types eliminated are TS 316, TS 347 and TS 347A. TS 316 was established in compliance with a governmental order to conserve molybdenum during the Korean War. This restriction no longer exists. The steel industry now is producing 316 and 316L which provide higher molybdenum content, with a resultant increase in corrosion resistance.

TS 347 and TS 347A also were

New List of Standard Types of Stainless and Heat-Resisting Steels

Chemical Composition, per cent

AISI Type Number	C	Mn Max	P Max	S Max	Si Max	Cr	Ni	Mo	Other
301	0.15 max	2.00	0.045	0.030	1.00	16.00-18.00	6.00-8.00	....	....
302	0.15 max	2.00	0.045	0.030	1.00	17.00-19.00	8.00-10.00	....	....
302B	0.15 max	2.00	0.045	0.030	2.00-3.00	17.00-19.00	8.00-10.00	....	....
303	0.15 max	2.00	0.20	0.15 min	1.00	17.00-19.00	8.00-10.00	0.60* max	Zr 0.60* max
303 Se	0.15 max	2.00	0.20	0.06	1.00	17.00-19.00	8.00-10.00	....	Se 0.15 min
304	0.08 max	2.00	0.045	0.030	1.00	18.00-20.00	8.00-12.00	....	....
304L	0.03 max	2.00	0.045	0.030	1.00	18.00-20.00	8.00-12.00	....	....
305	0.12 max	2.00	0.045	0.030	1.00	17.00-19.00	10.00-13.00	....	....
308	0.08 max	2.00	0.045	0.030	1.00	19.00-21.00	10.00-12.00	....	....
309	0.20 max	2.00	0.045	0.030	1.00	22.00-24.00	12.00-15.00	....	....
309S	0.08 max	2.00	0.045	0.030	1.00	22.00-24.00	12.00-15.00	....	....
310	0.25 max	2.00	0.045	0.030	1.50	24.00-26.00	19.00-22.00	....	....
310S	0.08 max	2.00	0.045	0.030	1.50	24.00-26.00	19.00-22.00	....	....
314	0.25 max	2.00	0.045	0.030	1.50-3.00	23.00-26.00	19.00-22.00	....	....
316	0.08 max	2.00	0.045	0.030	1.00	16.00-18.00	10.00-14.00	2.00-3.00	....
316L	0.03 max	2.00	0.045	0.030	1.00	16.00-18.00	10.00-14.00	2.00-3.00	....
317	0.08 max	2.00	0.045	0.030	1.00	18.00-20.00	11.00-15.00	3.00-4.00	....
321	0.08 max	2.00	0.045	0.030	1.00	17.00-19.00	9.00-12.00	....	Ti 5xC Min
347	0.08 max	2.00	0.045	0.030	1.00	17.00-19.00	9.00-13.00	....	Cb-Ta 10xC min
348	0.08 max	2.00	0.045	0.030	1.00	17.00-19.00	9.00-13.00	....	Cb-Ta 10xC min Ta 0.10 max
403	0.15 max	1.00	0.040	0.030	0.50	11.50-13.00			....
405	0.08 max	1.00	0.040	0.030	1.00	11.50-14.50			Al 0.10-0.30
410	0.15 max	1.00	0.040	0.030	1.00	11.50-13.50			....
414	0.15 max	1.00	0.040	0.030	1.00	11.50-13.50	1.25-2.50	....	....
416	0.15 max	1.25	0.06	0.15 min	1.00	12.00-14.00		0.60* max	Zr 0.60* max
416 Se	0.15 max	1.25	0.06	0.06	1.00	12.00-14.00			Se 0.15 min
420	Over 0.15	1.00	0.040	0.030	1.00	12.00-14.00			....
430	0.12 max	1.00	0.040	0.030	1.00	14.00-18.00		....	....
430F	0.12 max	1.25	0.06	0.15 min	1.00	14.00-18.00		0.60* max	Zr 0.60* max
430F Se	0.12 max	1.25	0.06	0.06	1.00	14.00-18.00			Se 0.15 min
431	0.20 max	1.00	0.040	0.030	1.00	15.00-17.00	1.25-2.50	....	....
440A	0.60-0.75	1.00	0.040	0.030	1.00	16.00-18.00		0.75 max	....
440B	0.75-0.95	1.00	0.040	0.030	1.00	16.00-18.00		0.75 max	....
440C	0.95-1.20	1.00	0.040	0.030	1.00	16.00-18.00		0.75 max	....
446	0.20 max	1.50	0.040	0.030	1.00	23.00-27.00		....	N 0.25 max
501	Over 0.10	1.00	0.040	0.030	1.00	4.00-6.00		0.40-0.65	....
502	0.10 max	1.00	0.040	0.030	1.00	4.00-6.00		0.40-0.65	....

* At producer's option; reported only when intentionally added.
Source: American Iron & Steel Institute.

established under government directives—to save columbium during the Korean War. These directives have expired. In place of TS 347 and TS 347A, a modification of 347 and the new-type 348 are being used.

Type changes that show up in the new list follow:

301, 302, 302B—These three are modified in carbon content—now 0.15 per cent maximum. It used to be over 0.08 to 0.20. Advances in electric melting furnace practices permit the reduction. Type 301 is used in the transportation industry; 302 is the most widely used of the chrome-nickel stainless steels; 302B is for high-temperature service.

304, 304L — Nickel content of these two is raised from 8.00-11.00 per cent to 9.00-12.00 per cent. This change is made largely for increased workability in the production of seamless tubing and larger sections produced from large ingots.

316, 316L—Molybdenum content of 316 remains at 2.00-3.00 per cent, but maximum carbon content is reduced from 0.10 per cent to 0.08 maximum. Type TS 316, which provided for lower molybdenum content during the Korean War, is abolished. Type 316L is revised to provide 2.00-3.00-per-cent molybdenum instead of 1.75-2.50. Type 316L differs from 316 by having a lower maximum carbon content—0.03 per cent—to minimize carbide precipitation.

317 — Two modifications have been made in this type. Carbon content is reduced from 0.10 per cent maximum to 0.08 maximum, and nickel is increased from 11.00-14.00 per cent to 11.00-15.00 per cent. The increased nickel content provides a better composition balance for optimum hot workability in the manufacture of large tubes and plates.

321 — This titanium stabilized type has an increase in nickel content—from 8.00-11.00 to 9.00-12.00—to provide a better composition balance for optimum hot workability in the making of large tubes and plates.

347, 348—These are basically columbium-stabilized steels. Because of the need to conserve columbium, 347 is modified to use columbium and tantalum rather than columbium alone. Columbi-

ores contain small quantities tantalum. Since both have the ne effect in stabilizing stainless els, their total content can be nsidered jointly in its ratio to bon content. Where 347 used have a columbium content of t times the carbon minimum, it w has a columbium-tantalum ntent of ten times the carbon nimum.

A number of investigations ow that tantalum-bearing steel equivalent in significant engi-ering, corrosion and heat-resist-g properties to the columbium pe. The Cb-Ta stainless steel s found an increasingly wide ceptance in the chemical and craft industries. A number of dely used industrial specifica-ons, Aeronautical Material Spec-cations and Military Specifica-ons call for, or permit, the use the Cb-Ta alloy. Type 348 is cluded in the new standards since limited but significant use has en found for a low tantalum .10 maximum) columbium-sta-lized grade. Nickel content for th 347 and 348 will be 9.00-3.00 per cent, compared with the rmer 9.00-12.00 for 347.

405—New specification for this pe calls for a chromium range 11.50-14.50 per cent instead of e former 11.50-13.50. This per-its meeting consistently the low uench hardness usually specified r this type. Type 405 general-is used for large weldments of 2 - per - cent - chromium material hich cannot be annealed after elding. It has a low carbon con-nt and an addition of aluminum retard hardening.

446 — Carbon content in this pe is reduced from a maximum f 0.35 per cent to 0.20. Produc-rs are regularly meeting this new, wer-carbon specification. This igh-chromium type offers excel-nt resistance to oxidation at ele-ated temperatures.

303Se, 416Se, 430F Se — These hree types, which were added to he list, provide improved ma-hinability through the addition f selenium. These and the high-ulphur, free-machining types are ermitted to have higher phos-horus contents than other types f stainless. Phosphorus also in-reases machinability in some ases. Some reports indicate that selenium helps reduce tendencies for seizing and galling.

501, 502 — Changes for these types provide for addition of 0.40-0.65-per-cent molybdenum, to conform with current practice. Types 501 and 502 are used largely in the petroleum industry.

Southern Electric Steel Builds

Southern Electric Steel Co., a newly organized firm in Birmingham, is erecting a plant. It will have a 12-ton electric furnace which will make billet-size ingots, a rolling mill, finishing department, melt shop and an office building.

Officers are Hugh Bigler, president and treasurer; Roy E. Scholl, executive vice president; and William M. Neal, vice president and secretary.

Stainless Bearings Reduced

Prices of standard, stainless-steel bearings have been reduced by New Hampshire Ball Bearings Inc., Peterborough, N. H. Now selling at prices quoted for chrome-steel bearings, stainless commanded a premium for many years.

Armco Getting New Bar Mills

Armco Steel Corp., Rustless Division, Baltimore, producer of stainless steel, expects to complete its new bar mills by the end of this year and begin production in January. The 60,500-square-foot mill will cost about $5,500,000.

Shipments of Steel Products—February, 1955

(Carbon, Alloy and Stainless)

(Net Tons)

Products	February Shipments — Carbon	Alloy	Stainless	Total	Year To Date
Ingots	17,185	14,571	1,547	33,303	63,579
Blooms, etc.	182,443	38,086	1,207	221,736	394,364
Skelp	10,965	.....	.....	10,965	16,976
Wire rods	86,131	1,619	778	88,528	173,360
Total semifinished	296,724	54,276	3,532	354,532	648,279
Structurals	336,621	1,625	20	338,266	674,361
Steel piling	26,655	.....	.....	26,655	48,135
Plates	436,935	18,565	1,466	456,966	895,684
Rails (standard)	96,900	.....	.....	96,900	189,339
Rails (other)	6,130	.....	.....	6,130	10,809
Joint bars	2,912	.....	.....	2,912	6,195
Tie plates	18,986	.....	.....	18,986	34,612
Track spikes	5,985	.....	.....	5,985	10,950
Wheels	21,480	120	.....	21,600	43,405
Axles	8,233	14	.....	8,247	15,605
Total rails & Accessories.	160,626	134	.....	160,760	310,915
Bars—HR	473,024	154,364	3,108	630,496	1,253,662
Bars—reinforcing	128,219	.....	.....	128,219	243,969
Bars—CF	108,469	21,808	3,869	134,146	269,751
Tool steel	1,120	6,782	.....	7,902	15,724
Total Bars	710,832	182,954	6,977	900,763	1,783,106
Standard pipe	202,349	111	.....	202,460	396,652
Oil country goods	157,416	28,425	.....	185,841	364,751
Line pipe	135,409	.....	.....	135,409	254,786
Mech. tubing	49,186	18,278	380	67,844	133,915
Pressure tubing	14,831	2,608	1,033	18,472	37,224
Total pipe	559,191	49,422	1,413	610,026	1,187,328
Wire—drawn	215,591	3,657	2,399	221,647	438,565
Nails—staples	51,256	.....	.....	51,256	100,736
Barbed wire	14,523	.....	.....	14,523	25,378
Woven fence	36,633	.....	1	36,634	65,725
Bale ties	2,890	.....	.....	2,890	5,181
Total Wire	320,893	3,657	2,400	326,950	635,585
Black plate	56,580	.....	.....	56,580	118,953
Tin & terne plate—HD.	88,189	.....	.....	88,189	171,063
Tin plate—electrolytic	344,467	.....	.....	344,467	680,149
Total Tin Mill Products.	489,236	.....	.....	489,236	970,165
Sheets—HR	702,597	28,099	3,154	733,850	1,467,540
Sheets—CR	1,118,184	4,479	9,175	1,131,838	2,318,942
Sheets—Gal.	199,234	174	.....	199,408	410,509
Sheets—other coated	19,884	.....	.....	19,884	40,555
Sheets—enameling	22,310	.....	.....	22,310	42,376
Electrical sheet & strip	11,521	47,223	.....	58,744	115,555
Strip—HR	155,825	2,317	565	158,707	316,795
Strip—CR	109,870	1,007	20,128	131,005	263,633
Total Sheet & Strip.	2,339,425	83,299	33,022	2,455,746	4,975,905
Total Shipments (1955)	5,677,138	393,932	48,830	6,119,000	12,129,463
Total Shipments (1954)	5,017,246	312,971	34,761	5,364,978	11,092,441

PAPER

AUTOMOTIVE

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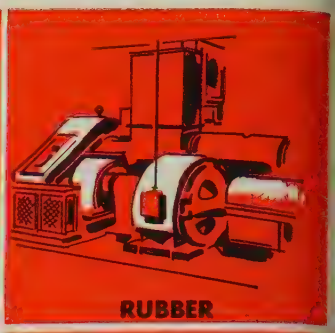
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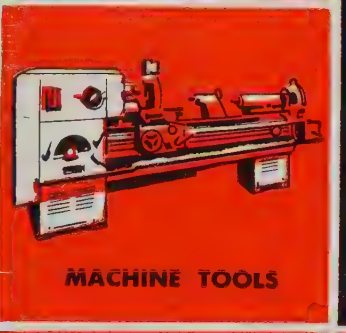
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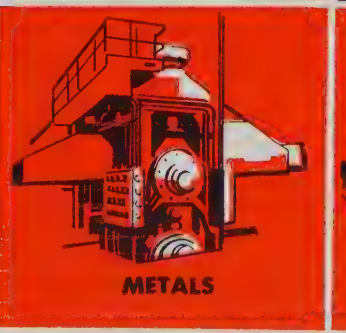
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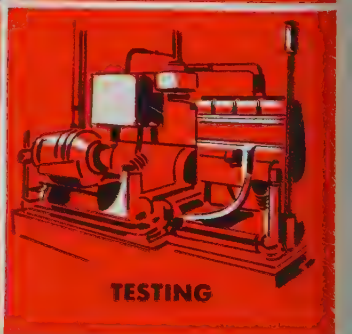
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U. S. Iron and Steel Exports
(net tons)

	Total	Semifinished
1955*	3,600,000	500,000
1954	3,029,000	38,000
1953	3,100,000	196,000
1950	2,893,000	185,000

*Estimated

Ingalls Shipbuilding Corp.

though foreign users are starved for steel . . .

.S. Demand Puts Lid on Exports

MESTIC industry is not being sold rt in the competition for steel.

Although U. S. exports will turn some 18 per cent this year (see le), the tonnage gain is insignifi- t compared with the expected 17.3 lion ton sprint in domestic ship- nts. One reason: Canada, tradi- ally our big steel export market, nlikely to increase her take.

Scarcity—Elsewhere, it's a differ- story. European demand for el far outruns supply. Although the member countries of the European l & Steel Community are produc- at a record postwar rate—12.7 lion tons in the first quarter of year, against 9.9 million tons for corresponding period last year—re simply is not enough steel to round.

Most striking change in the export picture is the heavy movement of semifinished steel predicted for this year. Up to a point, Europe's finishing mills can take care of booming auto, heavy construction, machinery and shipbuilding demands, but she is short on basic steelmaking capacity.

Pressure—Now that governmental building controls are lifted, English structural steel users are putting pressure on the mills. The rerolling trade is short of semifinished and cannot operate at capacity. In Germany, shortages again are particularly noticeable in steel bars and wire. In both countries all plants are heavily booked. Some are refusing orders.

European producers' problems are compounded since they must satisfy their own export markets. To hold business in Argentina and the Commonwealth, England is losing money by exporting large quantities of tin plate. She imports it at higher prices from the U. S. to meet domestic needs. German shipbuilding yards have large export orders booked, and one steel and rolling mill manufacturer has seven integrated steel plants in the works for export.

Growth—Foreign interest in American finished steel also is growing. The German Volkswagen auto plant is importing large quantities of strip from the U. S., as is Opel, the GM auto subsidiary. English automakers join the Germans in praising the superior deep-drawing qualities of the American product, and are becoming more willing to pay a premium.

Overseas markets for tin plate are another factor in the upturn. In January, we shipped about 75,820 tons, almost double the 1953 monthly average. Europe is at about as can conscious as Americans were 20 years ago, though her production of electrolytic tin plate is still aborning.

Outlook—Other growth markets: Galvanized products in South America and the Philippines. Plates for shipbuilding in the United Kingdom, Scandinavia, Netherlands and Germany.

Because of the acceleration in the domestic economy, foreign steel buyers are being turned down by American producers. But if domestic demand should slack off, it's likely that exports will rise above the 4-million-ton mark by year end.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 153 & 154

Carryover sheet tonnage from the second to third quarter will be substantial. In some instances, a month or more of production will likely be blanked out to care for the overflow. This applies particularly to cold-rolled and galvanized sheets, but there will be some slopover also in hot-rolled and certain specialties, such as enameling stock.

More mills are parceling out cold-rolled tonnage for the third quarter on an informal basis in New England. Buying in that area, however, is off somewhat, with consumers covered well into the period.

A leading Chicago mill finds customers want more third quarter tonnage than it can furnish. Its carryover amounts to almost one month's production. This applies to cold-rolled, enameling, galvanized and wide widths of hot-rolled. No indication of a decline in auto requirements in the third quarter is seen yet.

Over-all sheet demand is seen

(*Please turn to page* 168)

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: .Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload lump, bulk, C 0.025% max. (Simplex 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%. Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered, Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max) $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.5c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer. (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching, Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotitanium—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta., deld.; less ton lots $6.30.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c pel lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%), C.l. packed, 17.50c per lb of alloy, ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

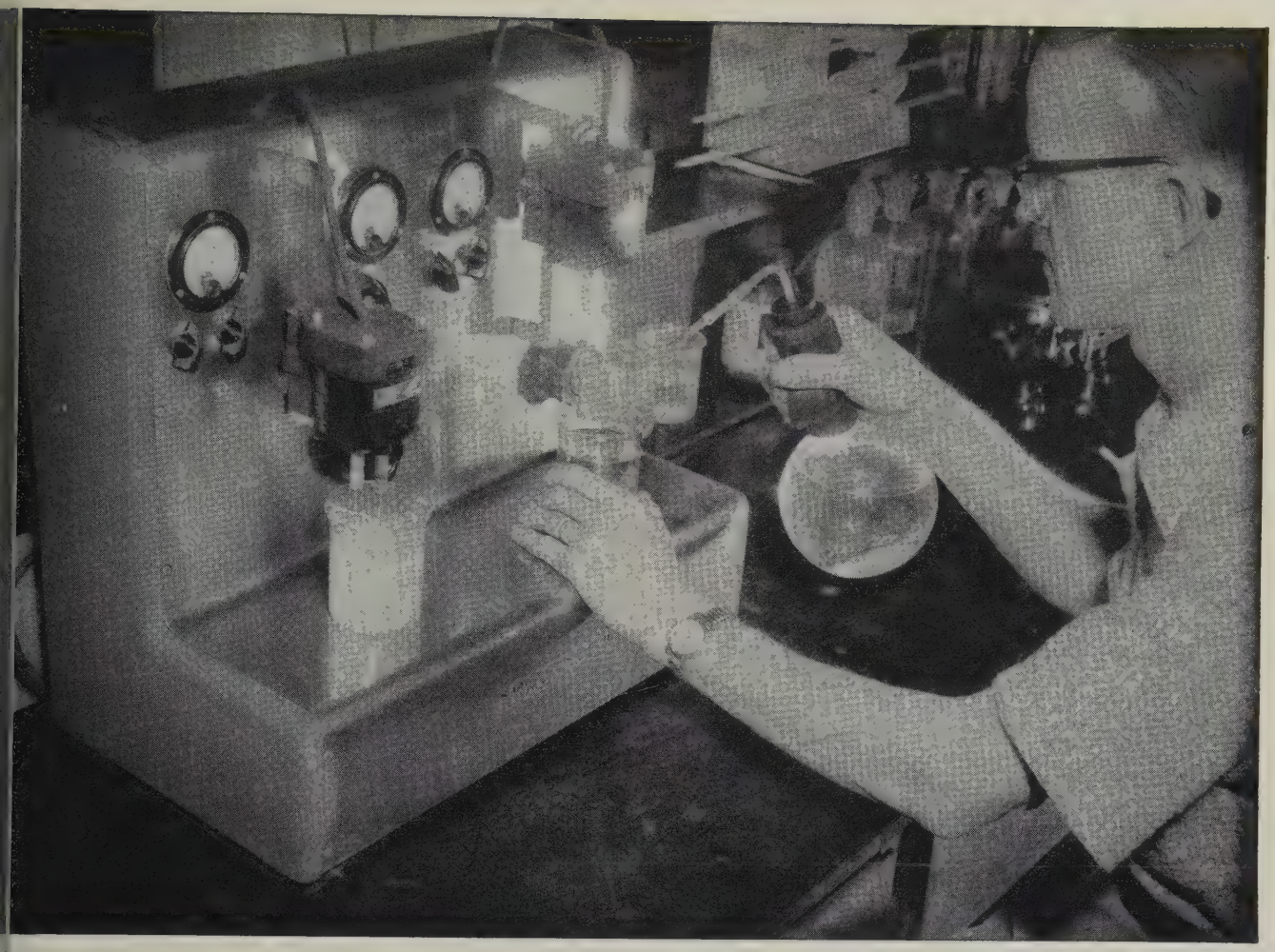
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c. f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity, $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington Pa., $1.24.



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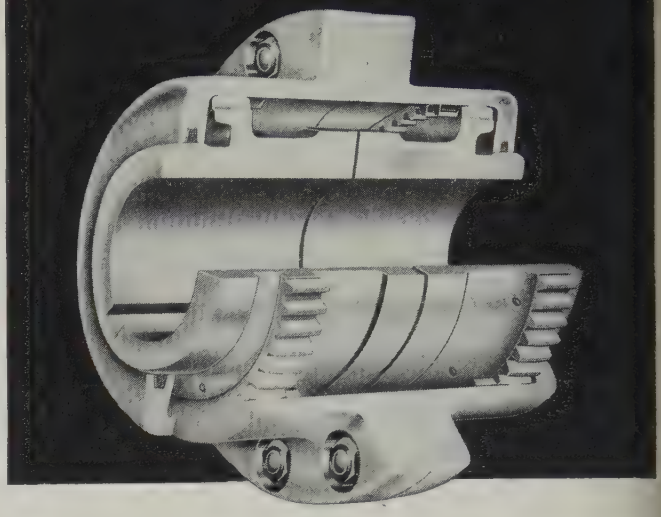

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For more than 66 years we have been producing metal-working tools and adding to our standard line. Today we keep such an extensive range of styles and sizes of PUNCHES and DIES on hand that we can fit most makes of punch presses from stock. The tools you need are *immediately available* when you need them—at regular *low, standard prices.*

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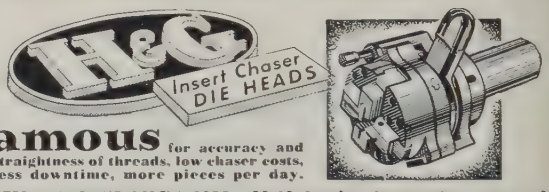

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res

Lake Superior Iron Ore

ices effective for the 1955 shipping season; ss ton, 51.50% iron natural, rail of vessel, er lake ports)

range bessemer	$10.40
range nonbessemer	10.25
sabi bessemer	10.25
sabi nonbessemer	10.10
n-hearth lump	11.25
h phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

ndry and basic 52-62% concentrates	
ontract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

edish basic, 60-68%	20.00
African hematite (spot)	nom. 18.00-20.00
zilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

reign, wolframite, good commercial	
uality	$25.00-$26.00
mestic, scheelite, mine	63.00

Manganese Ore

48%, nearby, 85c-87c per long ton unit f. U. S. ports, duty for buyer's account; 47%, 75c-80c.

Chrome Ore

ss ton, f.o.b. cars New York, Philadel- a, Baltimore, Charleston, S. C., plus ocean ight differential for delivery to Portland, g., Tacoma, Wash.

Indian and African

% 2.8:1	nom. $40.00-$42.00
% 3:1	42.00-44.00
% no ratio	32.00-34.00

South African Transvaal

% no ratio	$19.00-$20.00
% no ratio	31.00-32.00

Domestic

Rail nearest seller

% 3:1	$39.00

Molybdenum

lphide concentrate, per lb of Mo con- ent, mines, unpacked $1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

60%	$3.25-$3.80
%	4.15-4.25

Vanadium Ore

Cents per lb, V_2O_5 content, deld. mills

mestic	31.00

efractories

Fire Clay Brick (per 1000)

gh-Heat Duty: Pueblo, Colo., $94; Ashland, ahn, Hayward, Hitchins, Haldeman, Olive ll, Ky., Athens, Troup, Tex., Beech Creek, earfield, Curwensville, Lock Haven, Lum- r, Orviston, West Decatur, Pa., Bessemer, a., Farber, Mexico, St. Louis, Vandalia, ., Ironton, Oak Hill, Parral, Portsmouth, , Ottawa, Ill., Stevens Pottery, Ga., $114; lina, Pa., $119; Niles, O., $125; Los Angeles, ttsburg, Calif., $137.20.

Silica Brick (per 1000)

andard: Alexandria, Claysburg, Mt. Union, roul, Pa., Ensley, Ala., Portsmouth, O., 20; Warren, Niles, O., Hays, Pa., $125; orrisville, Pa., $123.50; E. Chicago, Ind., liet, Rockdale, Ill., $130; Cutler, Utah, 21.55; Los Angeles, $127.85.

per Duty: Hays, Sproul, Pa., Warren, Wind- m, O., Athens, Tex., $137; Morrisville, Pa., les, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

earfield, Pa. $130; Philadelphia, $116; Wood- idge, N. J., $114.

Insulating Fire Brick (per 1000)

00° *F:* Massillon, O., $178.50; Clearfield, a., $213; Augusta, Ga., Beaver Falls, Zeli- ople, Pa., Mexico, Mo., $206; Vandalia, Mo., 14.10; Portsmouth, O., $207.50; Bessemer, la., $212.80.

Ladle Brick (per 1000)

ry Pressed: Bessemer, Ala., $64.60; Alsey, l., Chester, New Cumberland, W. Va., Free- ort, Johnstown, Merrill Station, Pa., Mexico, o., $77.50; Wellsville, O., $81.50; Clearfield, a., Portsmouth, O., $87; Perla, Ark., $109; os Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

Per Cent: Clearfield, Pa., St. Louis, Mexi- , Mo., $181; Danville, Ill., $169.30.

Per Cent: St. Louis, Mexico, Vandalia, Mo., earfield, Pa., $225; Danville, Ill., $213.20.

Per Cent: St. Louis, Mexico, Vandalia, Mo., 60; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

eesdale, Johnstown, Bridgeburg, Pa., $147; earfield, Pa., $148.50; St. Louis, $159.30; thens, Tex., $155.

Nozzles (per 1000)

eesdale, Pa., $234.70; Johnstown, Pa., 40.70; Clearfield, Pa., $241.40; St. Louis, 59.45; Athens, Tex., $247.70; Bridgeburg, a., $267.50.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¾-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.50
Camden, N. J., ovens	24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, Ind., ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	24.00
Swedeland, Pa., ovens	24.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32.$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

Inches Diam	Inches Length	Per 100 lb
GRAPHITE		
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5⅛	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25
CARBON		
8	60	11.40
14, 12, 10	60	11.10
14	72	10.25
17	60	10.25
17	72	9.85
20	84	9.85
20	90	9.65
24	72, 84	9.85
24	96	9.60
30	84	9.75
40, 35	110	9.50
40	100	9.50

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(*Concluded from page* 163)

strong for at least the next four or five months. Some of the larger appliance makers have labor negotiations coming up this fall and are planning to keep their operations humming throughout the summer.

Associated Spring Corp., Bristol, Conn., is installing a new Sendzimir, reversing, cold-rolling mill that will increase its rolling and finishing capacity 50 per cent. The company is producing high-carbon, annealed, cold-finished, spring-steel strip and tempered spring steel, 0.61 to 1.05 carbon.

Tin Plate . . .

Tin Plate Prices, Page 154

Indications are that demand for tin plate in the third quarter is going to be as strong, or stronger, than it was during the second quarter. This would follow the customary market pattern. During both periods canmakers put emphasis on containers for the vegetable and food packs.

Steel Bars . . .

Bar Prices, Page 152

Supply is tightening noticeably in the bar market, though buying pressure is less intense than it is with flat-rolled products. Producers of hot-rolled bars in the East have nothing left for delivery this quarter and are entering increasing tonnage for third-quarter shipment.

This, in part, reflects strong demand. But exerting even more influence on the delivery situation, say some market observers, is diversion of semifinished steel to the more profitable production categories. Currently, district producers are booking substantial orders from bolt and nut makers. Also, cold finishers appear to be ordering hot bars in heavier volume.

The bulge in orders has extended shipments on all carbon grades and alloys in New England. Consumers now are covering needs 60 days and beyond. They had been on a 30-day basis. Hot-rolled carbon schedules now are out to July and cold-finished shipments average three months on rerolling, with mill stocks badly depleted. Leaded carbon stock is booked well into the third quarter, alloys seven to eight weeks and stainless, five to six weeks.

At Philadelphia, hot-rolled bar demand is active and more diversified, with some producers booked solidly well into July. Volume at Chicago is improving but lacks the pressure noted in the flat-rolled market. Main difficulty is lengthening rolling cycles.

Wire . . .

Wire Prices, Pages 154 & 155

Heavy requirements of consumers for manufacturers wire are reflected in lengthening deliveries, now extending well into June. The seasonal upswing in merchant wire demand also is contributing strength.

While orders for manufacturers, heading and spring wire are noticeably heavier, New England consumers are reluctant to recognize the need for longer lead time.

On numerous finished high-carbon grades and specialties, deliveries are more extended, compared with last quarter, but mill backlogs are not so heavy as to prompt forward buying in any marked degree. Finishing mill operations in New England are near capacity for some items, and rod supply has tightened. Still, producers are usually meeting delivery promises.

Farm repairs and construction requirements keep shipments of merchant items seasonally high at Pittsburgh and other producing points.

In the Eastern market, demand for rods continues outstanding. Spring wire also is moving well. Merchant products are seasonally more active, but volume business falls short of expectations.

Reflecting the recent increase in the price of zinc, the U. S. Steel Export Co. announces new export price bases on various wire products. Freight is included to New York, Philadelphia and Baltimore. The new prices, effective on shipments Apr. 26, are: Galvanized plain wire, $7.25 per 100 lb; barbed wire (Lyman 4 pt 5 in., $7.21 per 80-rod spool; Glidden, 4 pt 3 in. or 6 in. $8.27 per 100 lb; Iowa 4 pt 3 in. or 6 in. $8.27 per 100 lb; Waukegan, 4 pt 3 in. or 6 in. $8.37).

Plates . . .

Plate Prices, Page 152

Most platemakers are booked up through July, and increasing tonnage is being entered on books for the following two months of the third quarter. In the Chicago market, a producer just opening its books for the period finds it cannot fully accommodate customer demand, largely because carryover from the second quarter is indicated at about one month's output.

Warehouses, tank and structural fabricators are the most active buyers in the East. Line pipe requirements are felt only indirectly in the area as the result of the placing of heavy tonnages with inland producers. Railroad and shipwork lags.

Demand for plates by New England structural shops is heavier for built-up-plate girder work. Plate shops, including tank builders, ar bolstering inventories as seasonal im provement in fabricating work de velops. Only light, narrow plates ap pear available for shipment this quar ter in the district. Weldment require ments are heavier. Consumers in thi category are buying close to need

Several recent orders in the Pitt burgh area indicate railroad freigh car requirements are increasin

Tubular Goods . . .

Republic Steel Corp. reopened it large-diameter pipe mill at Gadsde Ala., Apr. 28. The company has a order for 30-in. diameter pipe for gas pipeline that will keep the mi (it had been down a couple of weeks in operation well into summer.

Consolidated Western Steel Divi sion, U. S. Steel Corp., now is pro ducing at its expanded pipe mil Geneva, Utah, making gas-line pip (26 in. in diameter) for the Pacifi Northwest Pipeline Corp. The mi produces expanded gas and petro leum-line pipe in sizes from 20 t 36 in. in diameter. Construction o a second mill for small-diameter, re sistant-weld line and water pipe i under way.

Utilities are buying more steel pip in New England (partly for esti mated requirements). Steel pipe, i appears, is being ordered for ga lines, to cut into the cast iron pip market to some extent.

The best delivery some mills ca give on the middle range of seamles is close to three months. Large sizes are still further extended. Butt weld under 4 in., can be obtaine within a month; also galvanized pip with some being available out o stock from a Pittsburgh mill.

Warehouse . . .

Warehouse Prices, Page 156

Sales of warehouse steel continu to increase. Most distributors repo April was their best month sinc last October.

Construction continues to requi more plates and structural shape There's a constant demand for mo sheets. Distress orders are not significant feature.

Orders are larger and more nu merous, reflecting the generally tigh situation at the mills where delive ies are running behind promises b as much as 35 days in some i stances. Sales are averaging abo 1800 lb per order, versus 1100 lb year ago. Many mill-size inquiri are being rejected.

Distributors' stocks generally a adequate to meet the demand, a though lengthening mill deliveri are beginning to pinch a little.

rap . . .

Scrap Prices, Page 170

hiladelphia—While there has been change on No. 1 bundles and No. usheling, prices on No. 1 heavy ting steel have eased to $37.50 vered. No. 2 heavy melting went $33.50-$34. Machine shop turn- s also are softer at $22-$22.50. s easing has developed despite n-level steelmaking operations.

ittsburgh—No important pur- ses of No. 1 scrap were reported week. Most other grades of l scrap declined an average of $1 on. The drop was partially in pathy with price declines the k previous, and it reflected the rket's weakness.

leveland—The scrap market here definitely weaker, with mill pur- ses lacking and plentiful supplies industrial material coming out. aler scrap is extremely sluggish. ntributing to the weaker tone is fact the latest automotive lists t at $2 down from prices made nonth ago.

For the present, steelmaking grades largely nominal and unchanged, h No. 1 heavy melting $33-$34 at veland and $35-$36 in the Valley. st furnace grades are off $1 per in the Valley and $2 in Cleveland.

New York—Shortage of nickel is lected in continued strong demand 18-8 stainless steel scrap, espe- lly from larger users. Brokers' ying prices on sheets, clips and ids now range $210-$235, in bor- s and turnings $100-$105. Prices straight chrome grades also are newhat higher, moving in sym- thy with the nickel grades. How- r, these grades are in fairly brisk mand. Type-430 sheets, clips and ids now are quoted $85-$90, type- 0 grades, $70-$75.

Brokers' buying prices on carbon- el grades of scrap are unchanged. nsumption is heavy but the mar- t undertone is a bit easy.

Buffalo—No new mill buying is reported, but steelmaking grades of dealer scrap are reported available here at $1 a ton under recently established market levels.

Prices Unchanged

Pipe, stainless steel, clad steel and tool steel prices remain unchanged. Current price schedules were published in full on page 138 of the Apr. 25 issue of STEEL.

Cincinnati—The absence of transactions gives the local market an undertone of weakness, putting all prices on a nominal footing.

Detroit—Scrap iron and steel prices are unchanged here. The market appears to be marking time.

Chicago—A scrap purchase by a leading mill embodies only one change from existing prices. No. 1 factory bundles are down $1 a ton to $37. Since that sale, another consumer purchased No. 2 heavy melting for $32, or $1 less than the previous acquisition.

Birmingham—The steel scrap market continues steady, with mills buying for immediate delivery.

Export prices are reported down $1 to $2 a ton from New Orleans to Norfolk, Va., according to port.

Los Angeles—Scrap sales volume in April was on a par with that of the preceding month, dealers report.

San Francisco—Local interest is picking up for steel scrap, with the mills pushing production to higher levels. Cast iron grades are in demand. Prices are firm.

Seattle—The scrap market is generally firm, owing largely to export influences.

Rails, Cars . . .

Track Material Prices, Page 155

Railroad steel sellers received a blow when 125 class-1 railroads recently told the Interstate Commerce Commission that they would spend 11 per cent less for capital goods than they did last year. Spending for the first half of 1955, they estimate, will be 15 per cent below the corresponding period of 1954—and last year was poor, especially for car buying.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 167

Semet-Solvay Division, Allied Chemical & Dye Corp. is operating

(*Please turn to page* 172)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Apr. 27	$36.00
Apr. 20	36.08
Mar. Avg.	37.50
Apr. 1954	25.67
Apr. 1950	29.40

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting..	35.00-36.00
No. 2 heavy melting..	32.00-33.00
No. 1 bundles	35.00-36.00
No. 2 bundles	27.00-28.00
No. 1 busheling	35.00-36.00
Machine shop turnings..	*21.00-22.00*
Mixed borings, turnings.	*21.00-22.00*
Short shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Cut structurals, 5 ft lengths	*40.00-41.00*
Heavy turnings	*34.00-35.00*
Punchings & plate scrap.	*40.00-41.00*
Electric furnace bundles.	*38.00-39.00*

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	33.00-34.00
Heavy breakable cast..	33.00-34.00
Unstripped motor blocks	22.00-23.00
No. 1 machinery cast..	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt	40.00-41.00
Rails, 2 ft and under.	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random lengths.	46.00-47.00
Railroad speecialties...	44.50-45.50

Stainless Steel Scrap

18-8 bundles & solids..	210.00-220.00
18-8 turnings	105.00-110.00
430 bundles & solids ..	95.00-100.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting...	33.00-34.00
No. 2 heavy melting...	29.00-30.00
No. 1 bundles	33.00-34.00
No. 2 bundles	26.00-27.00
No. 1 busheling	33.00-34.00
Machine shop turnings..	*15.00-16.00*
Mixed borings, turnings.	*22.00-23.00*
Short shovel turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Low phos.	33.00-34.00
Cut structural plate 2 ft and under	39.50-40.50
Alloy free, short shovel turnings	26.50-27.50
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Charging box cast	37.00-38.00
Stove plate	40.00-42.00
Heavy breakable cast..	34.00-35.00
Unstripped motor blocks	29.00-30.00
Brake shoes	32.00-33.00
Clean auto cast	46.00-47.00
No. 1 wheels	43.00-44.00
Burnt cast	33.00-34.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
R.R. malleable	45.00-46.00
Rails, 2-ft and under..	50.00-51.00
Rails, 18-in. and under.	51.00-52.00
Rails, random lengths.	45.00-46.00
Cast steel	39.00-40.00
Railroad specialties	39.00-40.00
Uncut tires	41.00-42.00
Angles, splice bars	46.00-47.00
Rails, rerolling	52.00-53.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	190.00-200.00
18-8 turnings	80.00-90.00
430 clips, bundles, solids	80.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting...	35.00-36.00
No. 2 heavy melting...	30.00-31.00
No. 1 bundles	35.00-36.00
No. 2 bundles	25.50-26.50
No. 1 busheling	37.00-38.00
Machine shop turnings..	*17.00-18.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00

CHICAGO

No. 1 heavy melting...	34.00-36.00
No. 2 heavy melting	*31.00-32.00*
No. 1 factory bundles...	*36.00-37.00*
No. 1 dealer bundles...	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	35.00-37.00
Machine shop turnings.	17.00-18.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings..	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals, 3 ft ..	37.00-38.00
Punchings & plate scrap	38.00-39.00
Electric furnace bundles.	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Stove plate	35.00-36.00
Unstripped motor blocks	29.00-30.00
Clean auto cast	*45.00-46.00*
Drop broken machinery..	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
R.R. malleable	46.00-47.00
Rails, 2-ft and under..	50.00-51.00
Rails, 18-in. and under.	51.00-52.00
Angles, splice bars	44.00-45.00
Rails, rerolling	52.00-53.00

Stainless Steel Scrap

18-8 bundles & solids.	220.00-225.00
18-8 turnings	95.00-100.00
430 bundles & solids..	105.00-110.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange

(Week ended Apr. 27)
No. 1 Heavy Melting

	High	Low	Close
Oct.	....	....	38.00*
Jan.	....	....	....

Sales (160-ton units): None.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting...	29.50
No. 2 heavy melting...	23.00
No. 1 bundles	29.50
No. 2 bundles	20.00
No. 1 busheling	29.00
Machine shop turnings.	13.00
Mixed borings, turnings	13.00
Short shovel turnings ..	17.50
Punchings & plate scrap	34.00

Cast Iron Grades

Charging box cast	28.00
No. 1 cupola	37.00
Stove plate	32.00
Heavy breakable	28.00
Unstripped motor blocks	20.00
Clean auto cast	42.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting...	32.00-33.00
No. 2 heavy melting...	28.00-29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Cast iron borings	17.00-18.00
Short shovel turnings ..	25.00-26.00
Machine shop turnings.	18.00-19.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate ..	36.00-37.00
Structural plate, 2 ft ..	36.00-37.00
Unstripped motor blocks	35.50-36.50

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	43.50-44.50
Rails, rerolling	43.00-44.00
Rails, random lengths.	39.00-40.00
Angles, splice bars	40.00-41.00
Stand. steel axles	35.00-36.00

PHILADELPHIA

(Delivered consumers' plant)

No. 1 heavy melting	*37.50*
No. 2 heavy melting	*33.50-34.00*
No. 1 bundles	37.50-38.00
No. 2 bundles	28.00
No. 1 busheling	37.50-38.00
Electric furnace bundles	40.00
Machine shop turnings..	*22.00-22.50*
Mixed borings, turnings	22.00
Short shovel turnings..	25.00
Structurals & plate....	41.00-42.00
Heavy turnings	34.00-35.00
Couplers, springs, wheels	42.50
Rail crops, 2 ft & under	52.00-53.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Malleable	44.00
Heavy breakable cast..	41.00
Drop broken machinery	44.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting..	32.00-32.50
No. 2 heavy melting..	28.00-28.50
No. 1 bundles	32.00-32.50
No. 2 bundles	24.00-25.00
Machine shop turnings.	12.00-13.00
Mixed borings, short turnings	14.00-15.00
Short shovel turnings..	15.00-16.00
Low phos. (structural & plate)	34.00-35.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Unstripped motor blocks	22.00-23.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips solids	*210.00-235.00*
18-8 borings, turnings	*100.00-105.00*
430 sheets, clips, solids..	*85.00-90.00*
410 sheets, clips, solids..	*70.00-75.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting..	29.00-30.00
No. 2 heavy melting..	22.00-23.00
No. 1 bundles	29.00-30.00
No. 2 bundles	17.50-18.00
Machine shop turnings.	12.00-12.50
Mixed borings, turnings	15.00-16.00
Short shovel turnings..	16.00-16.50
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast..	33.00-34.00

BUFFALO

No. 1 heavy melting...	32.00-33.00
No. 2 heavy melting...	27.50-28.50
No. 1 bundles	32.00-33.00
No. 2 bundles	25.50-26.50
No. 1 busheling	32.00-33.00
Mixed borings, turnings	20.50-21.50
Machine shop turnings.	19.00-20.00
Short shovel turnings ..	21.50-22.50
Cast iron borings	20.50-21.50
Low phos.	36.00-37.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	42.00-43.00

Railroad Scrap

Rails, random lengths..	35.00-36.00
Rails, 3 ft and under..	42.00-43.00
Railroad specialties	36.50-37.50

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting...	33.00-34.00
No. 2 heavy melting...	29.50-30.50
No. 1 bundles	33.00-34.00
No. 2 bundles	24.00-25.00
No. 1 busheling	33.00-34.00
Machine shop turnings.	19.00-20.00
Mixed borings, turnings	19.00-20.50
Short shovel turnings ..	22.00-23.00
Cast Iron borings	20.00-21.00
Low phos. 18-in.	38.00-39.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Heavy breakable cast..	35.00
Charging box cast	36.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 18-in. and under	48.00-49.00
Rails, random lengths..	40.00-41.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting...	31.00
No. 2 heavy melting...	29.00
No. 1 bundles	31.00
No. 2 bundles	24.50
Machine shop turnings.	15.00
Short shovel turnings ..	17.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Heavy breakable cast..	33.00
Unstripped motor blocks	33.00
Brake shoes	32.00
Clean auto cast	42.00
Stove plate	36.50

Railroad Scrap

No. 1 R.R. heavy melt	37.00
Rails, 18-in. and under	46.00
Rails, random lengths.	40.00-41.00
Rails, rerolling	50.00
Angles, splice bars	41.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting...	33.00
No. 2 heavy melting...	29.00
No. 1 bundles	25.00
No. 2 bundles	23.00
No. 3 bundles	16.00
Machine shop turnings.	12.00-14.00
Mixed borings, turnings	12.00-14.00
Short shovel turnings ..	12.00-14.00
Electric furnace, No. 1	35.00-37.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	36.00-40.00
Heavy breakable cast..	28.00
Unstripped motor blocks	30.00-32.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00-29.00
Brake shoes	28.00-29.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths..	30.00-34.00

LOS ANGELES

No. 1 heavy melting...	28.00
No. 2 heavy melting...	24.00
No. 1 bundles	27.00
No. 2 bundles	22.00
Machine shop turnings.	8.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting...	27.00
No. 2 heavy melting...	25.00
No. 1 bundles	26.00
No. 2 bundles	22.00
No. 1 busheling	27.00
Machine shop turnings.	8.00
Mixed borings, turnings	8.00
Short shovel turnings ..	10.00
Cast iron borings	10.00
Cut structurals	27.00
Heavy turnings	9.00
Punchings & plate scrap	27.00

Cast Iron Grades

No. 1 cupola	40.00-43.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast..	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop Broken machinery	48.00

HAMILTON, ONT.

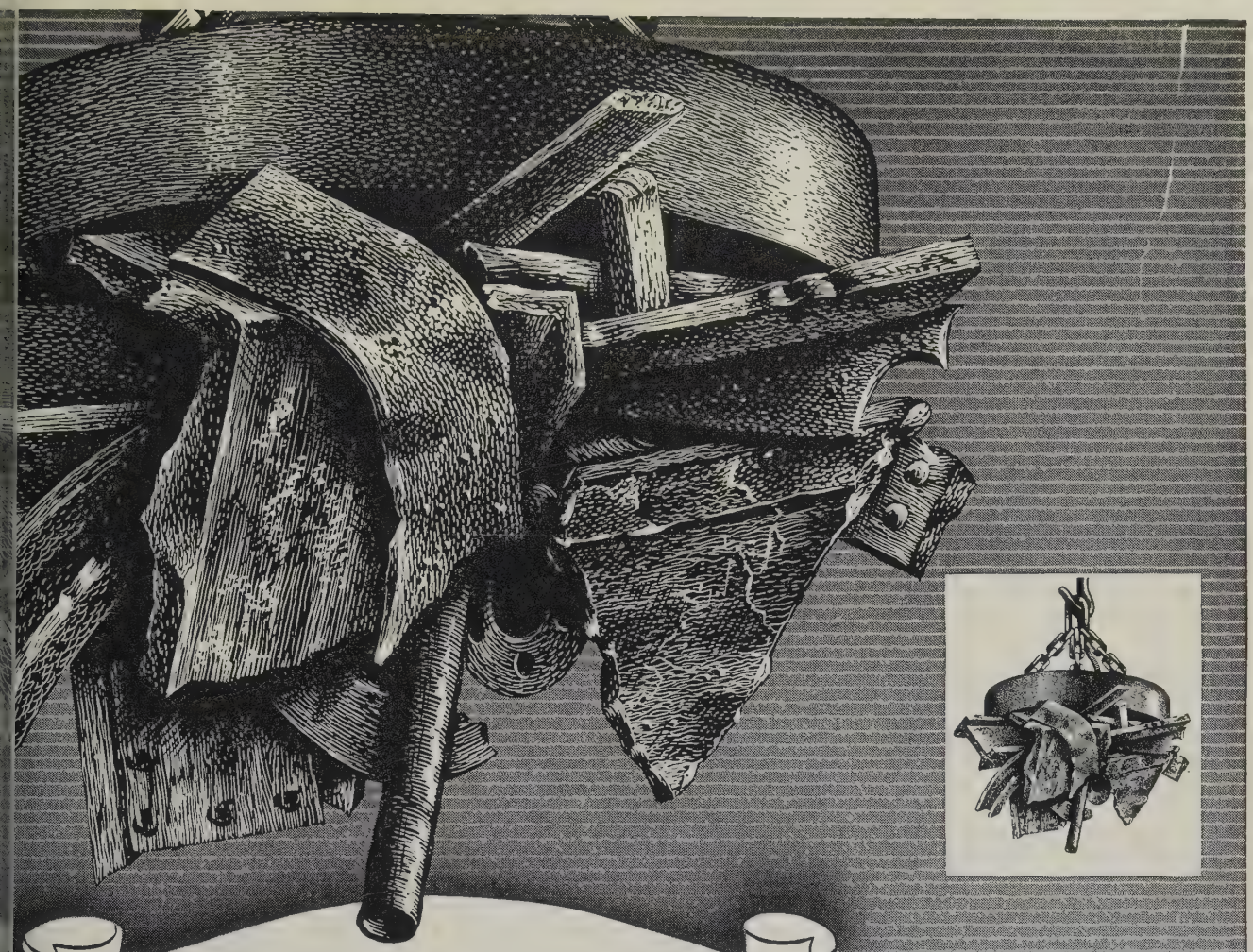
(Delivered prices)

No. 1 heavy melting..	34.00
No. 2 heavy melting..	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Mixed borings, turnings	16.00
Rails, remelting	43.00
Busheling, new factory: Prepared	32.00
Unprepared	28.00
Short steel turnings ..	16.00

Cast Iron Grades†

No. 1 machinery cast..	42.00-45.00

†F.o.b., shipping point.



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(*Concluded from page* 169)

a new, 24-oven battery of coke ovens at its Ironton, O. plant. The ovens, which replace a dismantled battery, bring the number at Semet's four coke plants back to 700.

A $10-million battery of coke ovens and auxiliary facilities will be constructed at Interlake Iron Corp.'s Chicago Works. The battery will include 50 ovens and replace facilities built in 1912.

Canada . . .

Production of iron and steel gained in Canada during February. Pig iron output totaled 215,075 net tons, against 199,464 in January and 182,050 in February, 1954. Steel production amounted to 321,252 tons, compared with 316,814 in the preceding month and 266,911 in February a year ago.

Iron Production Gains in March

Blast furnace production (pig iron, ferromanganese and spiegeleisen) increased again in March, reports the American Iron & Steel Institute. Output totaled 6,463,951 net tons, compared with 5,442,767 in February and 4,959,303 in March, 1954.

Of total production during the month, 6,406,902 tons were pig iron and 57,049 ferromanganese and spiegeleisen. The February breakdown was, 5,394,585 tons of pig iron and 48,182 tons of ferromanganese and spiegeleisen. In March a year ago, 4,907,147 tons of iron and 52,156 tons of ferromanganese and spiegeleisen were produced.

Furnace operations averaged 90.6 per cent of capacity in March. This compares with 84.5 in February and 71.2 in March, 1954.

First-quarter production amounted to 17,750,973 net tons, of which 17,590,493 were pig iron and 160,480 ferromanganese and spiegeleisen. In the first quarter of last year, 15,349,370 tons were produced, of which 15,202,897 were pig iron and 146,473 ferromanganese and spiegeleisen.

Operations averaged 85.7 per cent of capacity in the first quarter of this year against 75.9 in the like period of 1954.

Production data by districts follow:

Pig Iron . . .

Pig Iron Prices, Page 156

Pig iron demand is at a somewhat better rate than it was in March. The improvement is attributed in part to the more active build-up of inventories by consumers.

Consumption of basic iron is steady at a level substantially higher than it was in the first four months of last year.

Trading in merchant iron continues restricted in the Philadelphia district. Pipe shops are stepping up consumption, but operations at jobbing foundries are lagging, with some plants less busy than they were.

Foundry and malleable grades are not up to first-quarter shipments in New England, despite a heavier melt by textile mill equipment shops.

Iron Ore . . .

Iron Ore Prices, Page 167

Shipments of Lake Superior iron ore from upper lake ports totaled 1,476,197 gross tons in the week ended Apr. 25, reports the Lake Superior Iron Ore Association. They were double those of the like week of the 1954 shipping season. Cumulative shipments for the 1955 season now stand at 2,071,412 tons, an increase of 1,361,678 tons over the total of 709,734 tons shipped up to the corresponding date last year.

Structural Shapes . . .

Structural Shape Prices, Page 152

While eastern fabricating shops generally are busy and structural mills are pressed for tonnage, demand in the Philadelphia district is spotty and includes few outstanding projects.

In the immediate New York area, the nation's largest structural market, business is holding up well and is featured by the award of a 6000-ton office building.

The outlook for continued high demand for fabricated structural steel through the remainder of 1955 is encouraging in New England. While bridge tonnage is expected to predominate, miscellaneous construction is making seasonal gains. The Connecticut highway bridge program will take up some market slack in the second half of the year.

Structural shape supply is becoming tighter, with producers generally out of the market for the current quarter on both standard and wide-flange sections.

March structural steel bookings totaled 285,434 tons, highest in 22 months, reports the American Institute of Steel Construction. First-quarter bookings were 760,692 tons, up 19 per cent over the corresponding period of last year.

Shipments during March were 227,789 tons, a slight increase over the previous month but down sharply from the like month of 1954. Total shipments for the first three months of this year were 667,002 tons.

Backlogs as of Mar. 31 were 1,391,756 tons, against 1,645,452 a year ago.

BLAST FURNACE PRODUCTION

(Pig Iron, Ferromanganese & Spiegeleisen)

Net Tons

District	March 1955	March 1954	First Quarter 1955	First Quarter 1954
Eastern	1,352,879	1,083,060	3,619,372	3,388,648
Pittsburgh-Youngstown	2,251,344	1,715,577	6,200,981	5,238,936
Cleveland-Detroit	753,264	470,452	2,109,680	1,501,032
Chicago	1,345,058	1,053,638	3,705,447	3,257,454
Southern	454,315	440,937	1,280,651	1,316,978
Western	307,091	195,639	834,842	646,322
Totals	6,463,951	4,959,303	17,750,973	15,349,370

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6000 tons, 30-story office building, 479-95 Lexington Ave., New York, N. Y., through Uris Lexington Inc., to Harris Structural Steel Co., that city.

3300 tons, towers and miscellaneous construction, Long Sault dam and Iroquois dam, St. Lawrence river, near Massena, N. Y., for New York Power Authority, to American Locomotive Co., Schenectady, N. Y.

2255 tons, state hospital, Marcey, N. Y., through F. D. Rich, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

1800 tons, hangar and shop, airfield base, Jacksonville, Fla., to Decatur Iron & Steel Co., Decatur, Ala.; Henry C. Beck Co., Atlanta, general contractor.

1515 tons, shopping center, R. H. Macy & Co., Roosevelt Field, Long Island, N. Y., to Ingalls Steel Construction Co., Birmingham, Ala.

1360 tons, 19-story office building, East 54th St., New York, N. Y., through Knickerbocker Construction Co., to Grand Iron Works, Bronx, that city.

1045 tons, state highway bridge, route 42, section 12B, Camden county, N. J., through George M. Brewster & Co., to Elizabeth Iron Works, Union, N. J.

850 tons, shopping center, B. Altman, Short Hills, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

775 tons, store, Lord & Taylor, Garden City, Long Island, N. Y., to Simon Holland & Son Inc., Brooklyn, N. Y.

605 tons, Walt Whitman High School, Huntington, Long Island, N. Y., through John Kennedy, general contractor, to Simon Holland & Son Inc., Brooklyn, N. Y.

515 tons, extension, Meadowbrook state parkway, contract 3A, Jones Beach, Long Island, N. Y., through Hendrickson Bros., general contractor, to Harris Structural Steel Co., New York.

450 tons, junior high school, Hamden, Conn., to Connecticut Steel Co., New Haven, Conn.; Fusco-Amatruda & Co., New Haven, general contractor.

220 tons, employees home, Wards Island, New York, through Lasker Goldman, general contractor, to Schacht Steel Construction Inc., that city.

190 tons, highway bridge, Suffolk county, N. Y., through Hendrickson Bros., general contractors, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

120 tons, state bridge, Irvington, N. J., through the Mohawk Construction Co., general contractor, to the American Bridge Division, U. S. Steel Corp., Pittsburgh.

105 tons, building, Ransome Co., New Castle, Del., to Le Cates & Co., a Delaware fabricator.

STRUCTURAL STEEL PENDING

3905 tons, state bridgework, contract PE-4, Burlington county, N. J.; Franklin Con-

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New York, New York

cting Co., Newark, N. J., low on general ntract, with a bid of $3,357,144; work is der jurisdiction of New Jersey Turnpike thority, New Brunswick, N. J.; also re- red are 1495 tons of reinforcing steel.

tons, Third and Seneca streets, Seattle, nt building for Pacific Telephone & Tele- ph Co., Seattle; Bethlehem Pacific Coast el Corp., Seattle, reported low.

ons, Tacoma's (Wash.) proposed Mayfield m project; bids May 27.

tons, Pacific First Federal Bank building, rtland, Oreg.; bids in.

ons, two pumping plants, Hanford Works; ffman Construction Co., Portland, Oreg., v at $1,392,985 to the Atomic Energy mmission.

ated, locomotive shop and storage shed; o 400 ft of new track at McChord Air eld, Washington state; Roy T. Earley ., Tacoma, Wash., is low at $46,315 on nstruction.

ated, 200,000-bu grain elevator and ware- use for Rockford Grain Growers Associa- n; project to cost $140,000. Haskins Co., okane, Wash., has general contract.

ated, heavy-duty truck fabricating plant, ,000 sq ft for Kenworth Ltd., Vancouver, . C., to cost $500,000. The company is the nadian subsidiary of Pacific Car & undry Co., Seattle.

ated, 4½-mile bridge to cross the Colum- a river from Astoria, Oreg., to Washington ate. Tudor Engineering Co., San Fran- sco, has submitted report on feasibility of oject. On the Oregon side a 183-ft vertical earance is proposed for the ship channel, the Washington side a 150-ft clearance. tal cost is estimated at $23.4 million.

INFORCING BARS . . .

REINFORCING BARS PLACED

tons, 12 bridges and 6 culverts, Massa- usetts turnpike, Westfield-West Spring- ld, Mass., to Milton Steel Co., Milton, .; Lane Construction Corp., Meriden, nn., general contractor.

tons, three bridges, Massachusetts turn- ke, Otis-Becket, Mass., to Bethlehem eel Co.; Dane Construction Co., Somerville, ass., subcontractor for structures.

tons, addition to viaduct, Ketchikan, laska, to Bethlehem Pacific Coast Steel orp., Seattle; Scheumann & Johnson, eattle, general contractor.

tons, provincial house, Sisters of Charity, exington, Mass., to Northern Steel Co., edford, Mass.; M. S. Kelleher Co., Boston, eneral contractor.

tons, four state highway bridges, Man- hester, N. H., to U. S. Steel Supply Divi- ion, U. S. Steel Corp., Cambridge, Mass.; rank Palazzi & Sons Inc., Johnstown, . I., general contractor.

tons, Washington state overcrossing, pokane, to Bethlehem Pacific Coast Steel orp., Seattle; Clifton & Applegate, Yardley, Vash., low at $290,850.

tons, school, Columbia Point, Boston, to ruscon Steel Division, Republic Steel orp., Boston; Rich Bros. Construction Co., oston, general contractor.

tons, hangar and shop, airfield base, acksonville, Fla., to Atlantic Steel Co., tlanta; Henry C. Beck Co., Atlanta, gen- ral contractor.

tons, school, East Boston, Mass., to U. S. teel Supply Division, U. S. Steel Corp.,

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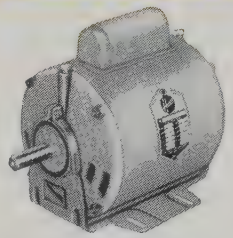

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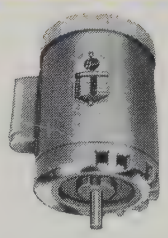

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Cambridge, Mass.; Joseph Rugo Co., Boston, general contractor.

112 tons, sewage treatment plant, Ft. Lewis, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Ostruske-Murphy Co., Tacoma, Wash., general contractor.

REINFORCING BARS PENDING

3000 tons, Mayfield power project, Washington state; bids to Tacoma Board of Contracts & Awards, Tacoma, Wash., May 27.

1495 tons, bridgework for the New Jersey Turnpike Authority, New Brunswick, N. J., in Burlington county; Franklin Contracting Co., Newark, N. J., low on general contract; project also requires 3905 tons of structural steel.

700 tons, overpasses and structures, Northeast expressway, Chelsea, Mass.; Gil Wyner Co., Malden, Mass., low on general contract.

215 tons, three bridges, Massachusetts turnpike, Sturbridge, Mass.; Henry Lundgren Co., Shrewsbury, Mass., low on general contract.

135 tons, post stockade and guardhouse, Ft. Lewis, Wash.; general contract to Macdonald Bldg. Co., Tacoma, Wash., low at $550,297.

80 tons, Washington state girder bridge, Lewis county; Pakar Construction Co., Chehalis, Wash., low and awarded at $77,083.

Unstated, Oregon state highway bridges, general contracts: 236-ft overcrossing, Clackamas county to Inland Construction Co., Milwaukie, Oreg., at $125,964; four concrete spans, Klamath and Lake counties, to Hamilton & Thomas, Eugene, Oreg., low at $120,310.

Unstated, 212-ft highway bridge; bids to Helena, Mont., Apr. 28.

Unstated, four storage igloos, Great Falls, Mont., airbase; Pappin Construction Co., Great Falls, low at $243,239 to U. S. Engineer.

Unstated, engineers armory and facilities, Camp Murray, Wash.; bids May 17 to U. S. Property & Fiscal Officer, Camp Murray.

PLATES . . .

PLATES PLACED

1000 tons, 10-million-gal water reservoir, Spokane, Wash., to Chicago Bridge & Iron Co., Seattle, low at $173,930.

485 tons, three tanks, California Oil Co., Perth Amboy, N. J., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

1000 tons, four 18-ft penstocks, Mayfield dam project, Washington state; bids to Tacoma, Wash., May 27.

100 tons, 300,000-gal elevated water tank, Glasgow, Mont., air base; bids to U. S. Engineer, Walla Walla, Wash., May 24.

PIPE . . .

CAST IRON PIPE PLACED

211 tons, Salem, Oreg., system expansion, to U. S. Pipe & Foundry Co., Seattle.

200 tons, 6 to 14 in., naval installation, Adak, Alaska, to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

439 tons, various sizes; bids to Corvallis, Oreg., Apr. 29.

211 tons, various sizes; bids to Seattle, Apr. 27.

Unstated, water system extensions, Anchorage, Alaska; bids to Alaska Public Works, Juneau, Alaska, May 18.

RAILS, CARS . . .

RAILROAD CARS PLACED

Erie, 500 box cars, with 300 fifty-ton double-door cars, equipped with Armco steel floors, going to Greenville Steel Car Co., Greenville, Pa., and 200 cars, equipped with stowing devices for shipping auto parts and other freight, to the General American Transportation Co., Chicago.

New York Central, 200 seventy-ton covered hopper cars, to Despatch Shops Inc., East Rochester, N. Y.

Southern Pacific, 350 seventy-ton hopper cars to the Butler, Pa., plant of the Pullman-Standard Car Mfg. Co., Chicago. These recently were noted as placed with an unnamed builder.

St. Louis-Southwestern, 50 fifty-ton pulp wood cars, to its own shops.

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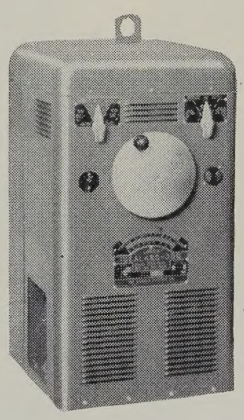
NOW!

DUAL ARC CONTROL on AC as well as DC

New Lincoln Idealarc gives choice of "soft arc" or "forceful arc" to suit the job

For the first time on AC welding you can select the right type arc for each job. That's because Lincoln Dual Arc Control gives you both "soft arc" for smooth, clean welds and "forceful arc" for penetration.



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Has Arc-Booster starting on DC as well as AC.

Operates on single-phase power.

Idealarc can be purchased to furnish both AC and DC welding current. It can be bought as a straight AC welder to which a unit can be added at any time to furnish DC current as well as AC.

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THE LINCOLN ELECTRIC COMPANY

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The World's Largest Manufacturer of Arc Welding Equipment

THE TREND IS TO THOMAS

Multiple Punches

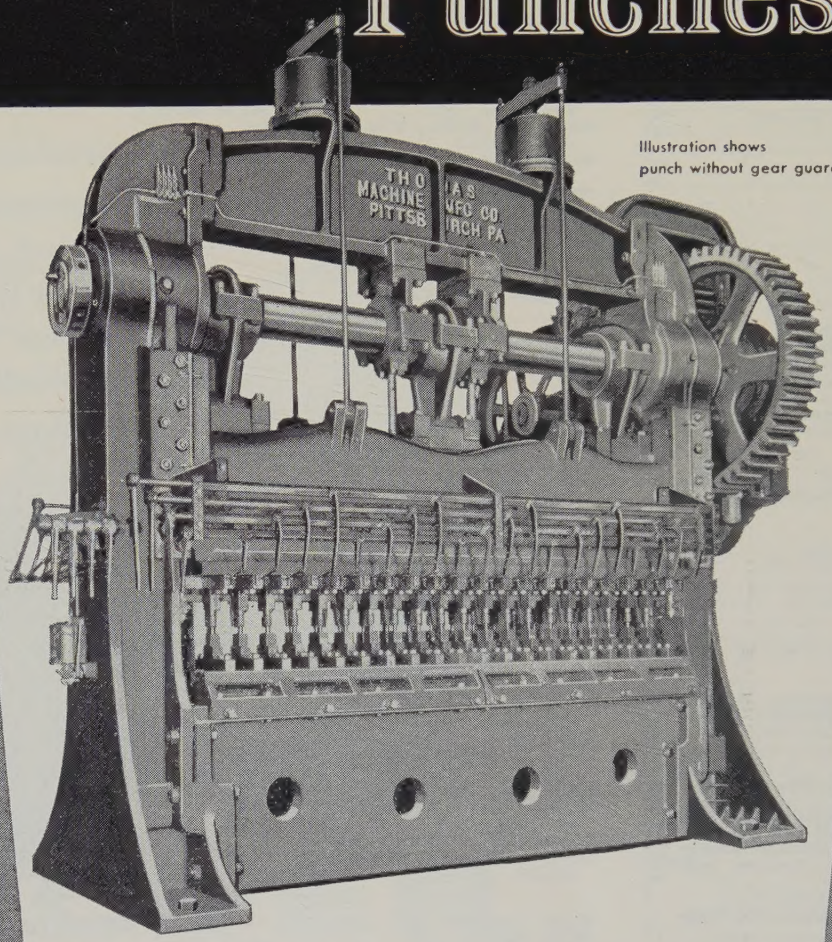

Illustration shows punch without gear guards

This 1000 ton capacity Multiple Punch was recently shipped by Thomas to one of the leading railroad car shops. It is being installed with a Thomas Automatic Spacing Table.

This combination will handle the complete punching of four center sill Z sections; two beams or channels; four angles or plates up to twelve feet wide. All automatically, without layout on the work.

Write for Bulletin 306

OTHER MULTIPLES
available in various widths and in tonnages of 225 up to the 1000 ton giant, with or without Spacing Tables.

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THOMAS
MACHINE MANUFACTURING CO.
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SPACING TABLES

43

Farval helps keep walking dragline working —no lost time for lubrication

FARVAL—
Studies in Centralized Lubrication
No. 168

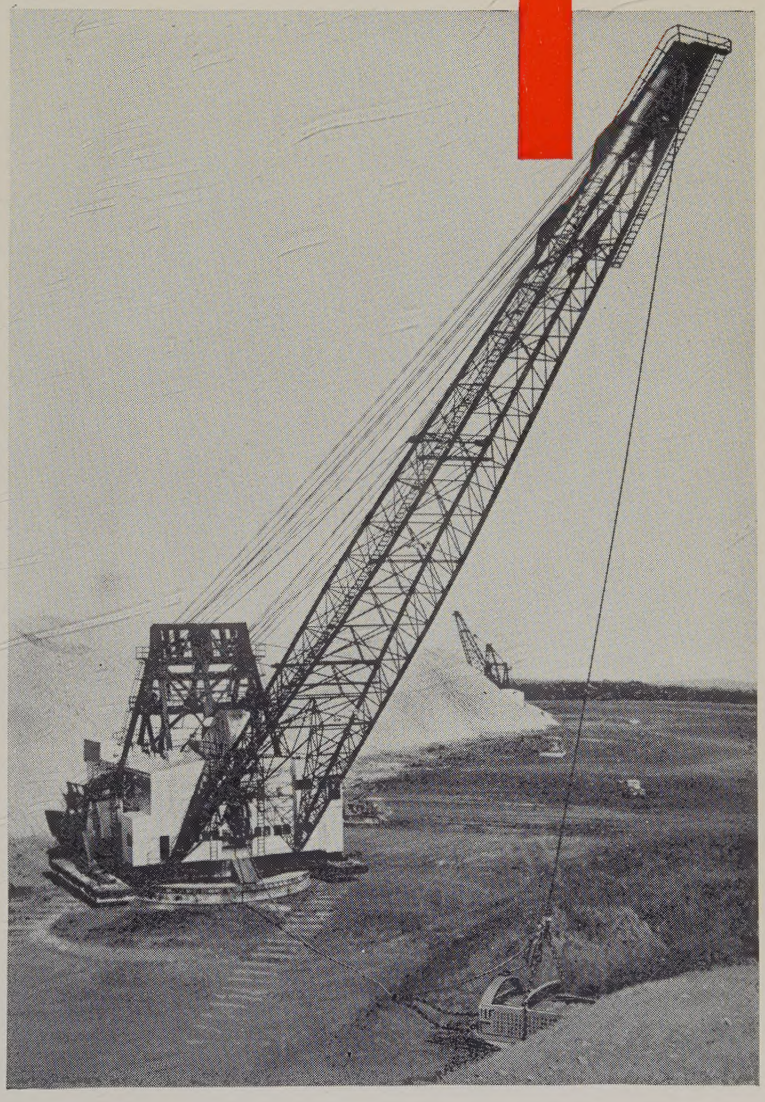
LUBRICATION requirements of this giant walking dragline are as complex as the machine itself. It was a tough problem to solve, but a planned Farval Centralized Lubrication system did it. Now, Farval helps keep the dragline working uninterruptedly with minimum time for lubrication.

The entire walking machinery needs a fresh supply of lubricant about every five steps—length of each step is 6 feet 2 inches. Hoisting, dragging and swinging machinery require lubricant on an 8-hour basis. 108 rollers in a roller circle that supports and permits rotation of the control house, require lubrication once every 24 hours. All told, 206 bearings require regular lubrication.

These varying lubrication frequencies are all handled efficiently and surely by one Farval automatic system divided into branches. Any part of the machinery can be lubricated independently of the others.

If you have an equipment lubrication problem, simple or complex, it will pay you to find out how a Farval Centralized Lubrication System can save you time, money and lubricant. Farval delivers oil or grease unfailingly, in the exact amount required when needed, to each bearing served. It can be installed on new or old equipment, often pays for itself in a few weeks or months. Thousands of Farval installations are improving lubrication and operations in practically all industries. Find out how Farval can help *you.* Write for technical advice and ask for Bulletin 26. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



Farval-lubricated walking dragline, one of the largest standard production machines of its kind in the world, serving at a Texas mine.

KEYS TO ADEQUATE LUBRICATION—**Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.**

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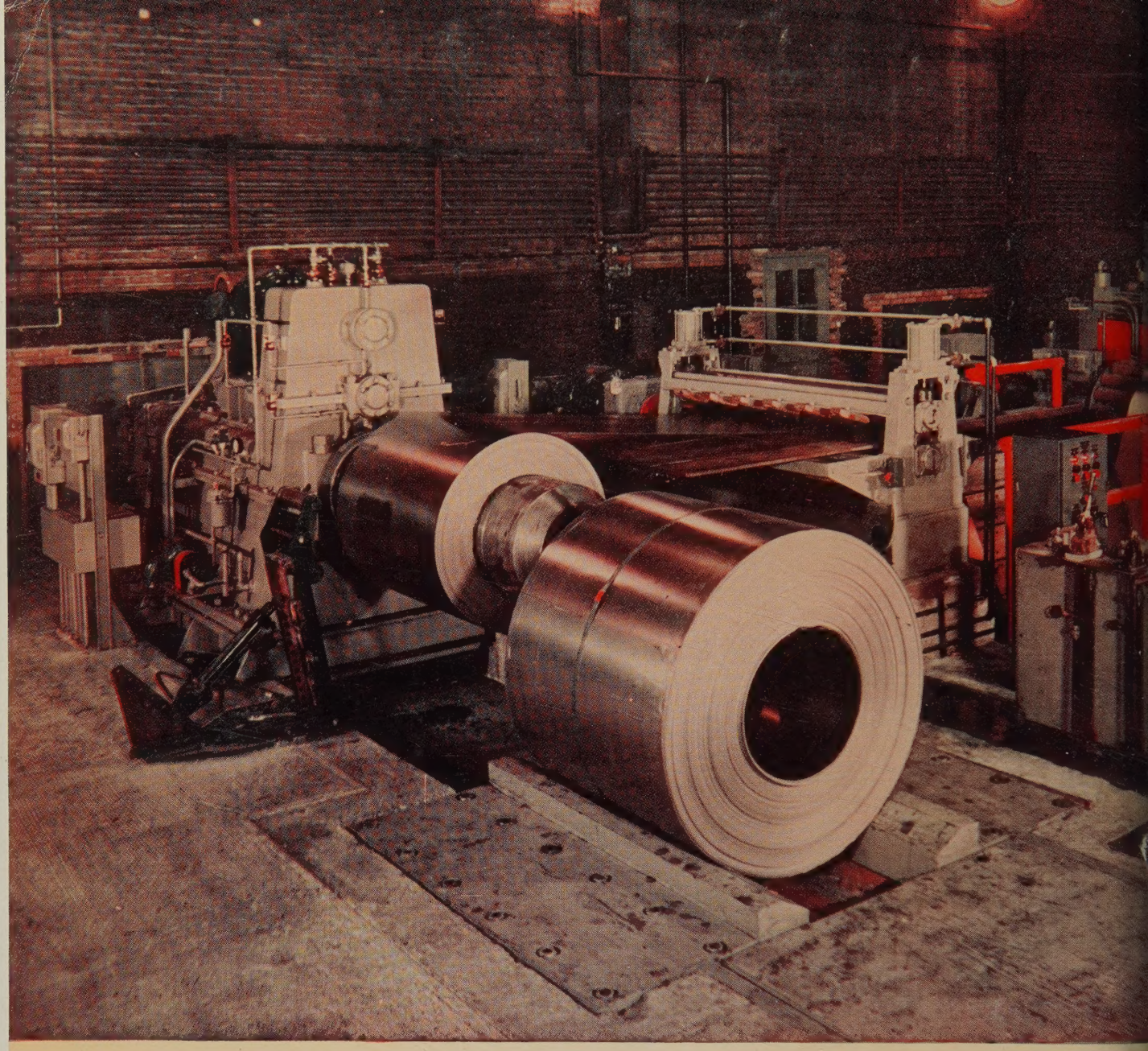
CENTRALIZED SYSTEMS OF LUBRICATION



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The WEAN ENGINEERING COMPANY, Inc.

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firms, like Wean, who designed and built the machinery necessa

Equipment designed and built by Wean continues to establish pe
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that causes leading steel producers the world over to make c
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